

**TENNESSEE CREEK PROJECT  
WILDLIFE BIOLOGICAL EVALUATION AND  
MANAGEMENT INDICATOR SPECIES REPORT**

**LEADVILLE RANGER DISTRICT  
SAN ISABEL NATIONAL FOREST**

**LAKE COUNTY, COLORADO**

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**U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE**



**Prepared by:**

/s/  
**Jeni Windorski**  
**Wildlife Biologist**

Date:

Contact: Jeni Windorski, Wildlife Biologist  
Leadville Ranger District  
810 Front Street  
Leadville, CO 80461  
719-486-0749  
Email: [jeniwindorski@fs.fed.us](mailto:jeniwindorski@fs.fed.us)

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## 1.0 INTRODUCTION

### 1.1 Purpose of this Biological Evaluation/Management Indicator Species Report

An endangered species is an animal or plant species listed under the Endangered Species Act (ESA) that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the ESA that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A proposed species or proposed critical habitat means an animal or plant species or habitats is proposed in the Federal Register to be listed or designated as critical habitat under Section 4 of the ESA. A sensitive species is an animal or plant species identified by the USDA Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species existing distribution. Proposed, endangered, threatened, and sensitive species (PETS) and habitat effects are summarized by PETS species and status. A separate Biological Assessment was prepared for this project covering federally proposed (candidate), endangered, and threatened species and designated critical habitat, and is in the project file.

This Biological Evaluation (BE) and Management Indicator Species (MIS) Report analyzes the potential impacts of the Tennessee Creek Project on the San Isabel National Forest (Forest) and White River National Forest on Forest Service (FS) sensitive species, as identified by the Region 2 Regional Forester (U.S. Forest Service 2011) as required in the Forest Service Manual (FSM 2670.31-2670.32) as well as forest designated MIS species outlined in forest land management plans/amendments. Potential effects of the project and associated forest management activities are analyzed. Plants and fish species are addressed in separate analysis reports. Species meeting the following criteria are addressed in this assessment:

1. known to occur on the Forest based on confirmed sightings;
2. may occur on the Forest based on unconfirmed sightings;
3. potential habitat exists for the species on the Forest; or
4. potential effects may occur to these species

### 1.2 Current Management Direction

Current management direction for federally proposed, threatened, endangered, and FS sensitive species on the Districts of the Forest can be found in the following documents, filed at each district office:

- Forest Service Manual and Handbooks (FSM/FSH 2670)
- National Forest Management Act (NFMA)
- Endangered Species Act of 1973, as amended (ESA or Act)
- Migratory Bird Treaty Act (MBTA)
- National Environmental Policy Act (NEPA)
- Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands (PSICC) Land Resource Management Plan (LRMP) (U. S. Forest Service 1984)
- White River National Forest (WRNF) LRMP 2002 Revision
- Species-specific Recovery Plans which establish population goals for recovery

- Species management plans
- Species management guides or conservation strategies
- Regional Forester policy and management direction
- Lynx Conservation Assessment and Strategy (LCAS) (Ruediger 2000)
- Southern Rockies Lynx Amendment (U. S. Forest Service 2008)
- Implementation Guide – Southern Rockies Lynx Amendment (U.S. Fish and Wildlife Service and U.S. Forest Service 2009)

### **1.2.1 PSICC LRMP and WRNF LRMP Direction**

Each LRMP provides management guidelines, which incorporate regional direction for each species addressed in this assessment. The Management Areas (MA) for the San Isabel NF included in this project that pertain to FS sensitive and MIS species addressed in this assessment are:

#### PSICC LRMP

- MA 4B Emphasis is on habitat for management indicator species (Forest Plan, pgs. III – 134 thru III – 143)
- MA 5B Emphasis on big game winter range (Forest Plan, pgs. III – 149 thru III – 160)

#### WRNF LRMP

The portion of White River NF management area inside the Tennessee Creek Project boundary is not specific to any threatened, endangered or sensitive (TES) or MIS species and is based around the existing ski area, Ski Cooper. (MA 8.25 Emphasis on Ski Resort).

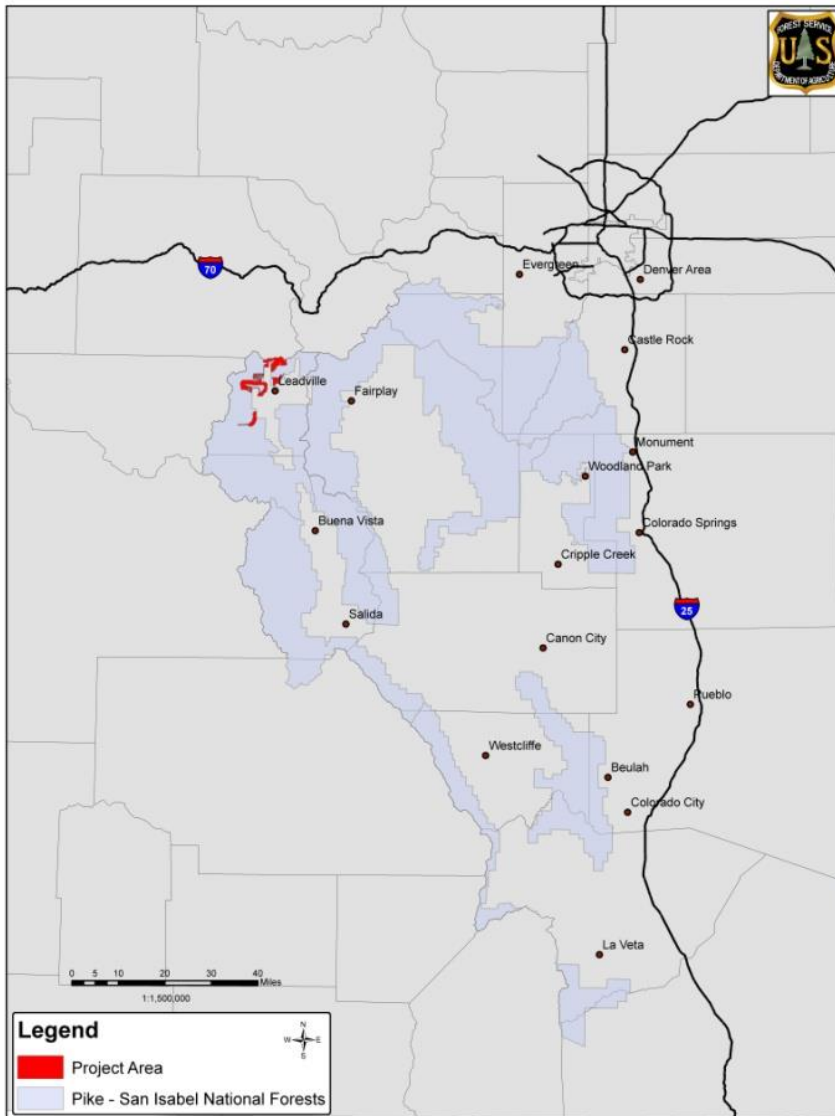
## **2.0 NEED FOR RE-ASSESSMENT BASED ON CHANGED CONDITIONS**

This BE and findings are based on the best current data and scientific information available. A new analysis and revised BE must be prepared if one or more of the following occurs: (1) new species information (including but not limited to a newly discovered activity area or other species information) reveals effects to sensitive species in a manner or to an extent not considered in this assessment; (2) the action is subsequently modified or it is not fully implemented as described herein which causes an effect that was not considered in this assessment; or (3) a new species is listed or critical habitat is designated which may be affected by the action that was not previously analyzed herein.

## **3.0 PROJECT AREA DESCRIPTION, LOCATION, AND MAP**

The Tennessee Creek project encompasses approximately 15,930 acres located in Lake County, Colorado near the town of Leadville on the San Isabel National Forest. An additional 520 acres (rounded to the nearest hundred acres) occurring on the White River National Forest, Eagle-Holy Cross Ranger District that are incorporated in the Ski Cooper boundary are also included in the extreme northern end of this proposal for a total of approximately 16,450 acres. Elevations in the area range from 9,600 feet (ft.) to over 11,800 ft. (See Map 1 below).

**Map 1.** Tennessee Creek Project Vicinity Map

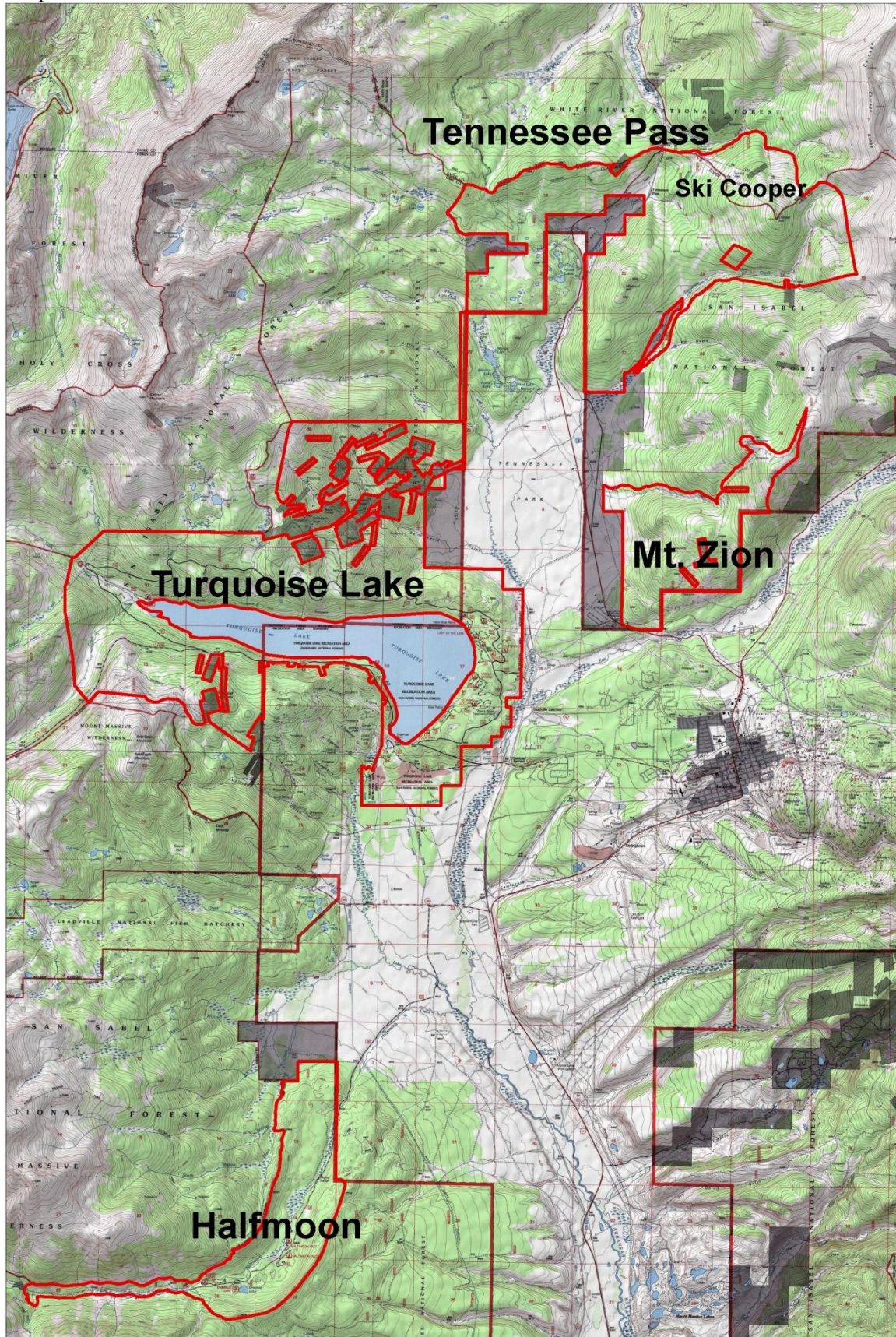


For this analysis, the action area is defined as within  $\frac{1}{2}$  mile of the proposed management action boundary for all species. The project is broken into several non-contiguous areas including: Tennessee Pass, Mt Zion, Turquoise Lake, and Halfmoon Creek (See Map 2 below). Major vegetation types within the project area include lodgepole pine (*Pinus contorta*), subalpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea engelmannii*). There are also minor amounts of Douglas-fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), bristlecone pine (*Pinus aristata*), aspen (*Populus tremuloides*), grasslands, willow, various forbs, grasses and sedges, as well as rocky areas and open water (see Table 1 below).

*Legal description: T8S, T9S, and T10S, R79W, R80W and R81W (the project area is within these township and ranges but does not cover all of the sections, please see Map 2 for details).*



**Map 2.** Project boundary (red) split into four different locations: Tennessee Pass (Ski Cooper), Mt. Zion, Turquoise Lake, and Halfmoon Creek.





**Table 1.** Amount of each vegetation/habitat type by acres within the project area that are ‘treatable’.  
(Source: PSICC common vegetation unit [CVU] database for National Forest lands).

Group Name	Cover Types	Group Acres
Lodgepole pine	Lodgepole pine	9,480
Spruce-fir	Spruce-fir Douglas-fir Bristlecone pine Blue Spruce	1,550
Meadows/sagebrush	Grass Forbs Fescue Willow Alder Sage	2,095
Aspen	Aspen	455
<b>TOTAL Treatable Acres*</b>		<b>13,580</b>

*\*“Treatable” acres consist of all acres within the project area excluding those in areas that are inaccessible due to slope or access reasons.*

A large portion of the Tennessee Creek project area consists of stands of mature lodgepole pine that is approximately 125 to 150 years old. Essentially these entire forests were cut during the late 1800’s and early 1900s to support the needs of a booming mining industry in the region. Monocultures of lodgepole pine subsequently regenerated with little species or age diversity in much of the project area. The small amounts of spruce-fir species present have been suppressed by lodgepole pine further reducing species diversity.

#### 4.0 PROPOSED ACTION AND ALTERNATIVES CONSIDERED

Three alternatives were developed in detail for this environmental analysis process. The alternatives described and studied in detail are:

##### 4.1 No Action Alternative

The No Action Alternative addresses the present actions that are occurring within the project area. Listed below is a representation of the present actions taking place in the Tennessee Creek project area; it is not intended to be all inclusive of present management activities.

- Within the footprint of the campgrounds/developed sites at Halfmoon Creek and Turquoise Lake, vegetation management (thinning, group selection, patch cuts, and chipping of slash) would continue. Annual treatments average 7 - 10 acres per year.
- Hazard tree removal at developed sites, Ski Cooper and along system trails and roads would continue as needed.
- Northwest Leadville Hazardous Fuel Project (ongoing vegetation management project) continues on a limited scope. Treatments would include pre-commercial

thinning, thinning of mature stands, and pile burning. Annual treatments average 10 – 20 acres per year for the next 3 years.

- Using Forest Plan Direction, continue to improve / rehabilitate the area adjacent to Halfmoon Creek (within 100 feet of the creek). Treatments include using boulders and buck & rail fence to restrict access and seeding to re-vegetate areas.
- Non-system route rehabilitation.
- Noxious weed monitoring and treatments.
- Regular maintenance of system trails and roads.
- Recreation activities would continue as authorized including snowmobiling, Nordic and alpine skiing, off-highway vehicle (OHV) use, biking and hiking etc.
- Outfitter and guide activities and other special events.

#### **4.2 Alternative 1 (Proposed Action)**

In addition to the previously stated ongoing actions listed in section 4.1 *No Action Alternative*, the following actions are proposed.

The Leadville Ranger District of the San Isabel National Forest proposes to implement an approximately 16,450 acre vegetation and watershed improvement project (the Tennessee Creek Project) over the next 10 years. The focus of this project is aimed at creating age class and species tree diversity by creating or augmenting existing openings on the landscape and thinning forested areas to varying degrees through mechanical and prescribe fire burning techniques. In addition to vegetation harvest treatments the following actions are being proposed as well: limited tree planting inside the Ski Cooper boundary, improving aquatic organism passageways (AOPs), closing and rehabilitating non-system route and dispersed camping sites where riparian areas are being negatively impacted, rehabilitating areas with erosion and compaction issues at some designated campgrounds, creating snags for wildlife habitat, installing a nesting platform for raptors (i.e., osprey, bald eagles) along Turquoise Lake, and restoring and improving stream habitat in the Halfmoon Creek drainage. These actions are discussed in more detail below.

“Treatable” acres consist of all acres within the project area excluding those in areas that are inaccessible due to slope or access reasons. Because of these limitations, about 13,580 acres out of the entire 16,450 project area acres will actually be “treatable”. Harvest treatments could take place year round using hand tools (chainsaws) and large machinery (dozers, log trucks, skidders, etc.) and those tools appropriate for implementing prescribed burns (engines, drip torches, chainsaws, etc.). Though it is extremely unlikely, operations could commence during the night hours. Conventional ground-based logging systems would be used to remove logs from areas that are accessible using existing National Forest System Roads, non-system routes, or constructed temporary roads. Approximately 20 miles of temporary roads would be needed to access treatment areas. On constructed temporary roads and non-system routes, access would be restricted to authorized personnel only. Authorized personnel include Forest Service personnel, contractors and permittees (i.e. individuals who have a valid fuelwood permit). Access would be restricted through the use of gates, barricades or other means as appropriate. Temporary roads would be closed by the most

appropriate means necessary (ripping, bouldering, gating etc.) when all treatments, including prescribed burning, are complete.

## **TREATMENTS IN LODGEPOLE PINE**

### Openings

The main species targeted for treatment within the project area is lodgepole pine with smaller amounts of treatments in aspen (See Table 2 below). Treatments that result in openings would take place on a maximum of 25% (approximately 2,370 acres) of the total acres of *treatable* lodgepole pine within the project area. Again, “treatable” acres within the project area are defined by those acres that are not limited by slope, accessibility, rocky substrates etc. Openings created mechanically would be limited to 40 acres or less in size whereas prescribed burn treatment units could exceed 40 acres and could include mechanically treated as well as untreated areas. In mapped lynx habitat, stands with high levels (35% or greater) of dense horizontal cover (DHC) would be retained for snowshoe hare foraging. These high quality stands would be identified and marked appropriately by personnel trained to measure horizontal cover with coverboards (a wildlife biologist or forester and/or crew that has been trained by the biologist). These areas would be identified on the ground and excluded from treatment. Stands that have obviously high horizontal cover as well as those with very low horizontal cover would not need to be measured as exclusion or inclusion in treatments would be obvious. Slash left on-site may be lopped and scattered, piled and burned, broadcast burned, crushed with yarding and harvesting equipment, or disposed of by other means. Reserve areas would be left on the landscape as refuge for wildlife species. The placement of these reserves in relation to treatment areas would be tailored to each individual treatment area and would be scattered throughout the entire project area. Reserve areas would be located throughout the project area and would consist of steep areas (greater than 35 percent), inaccessible areas, and wet areas. In mapped lynx habitat, stands with >35% dense horizontal cover would also be retained. In addition to this, approximately 10 percent of the areas identified for thinning would be left as reserve areas. There would be at least 200 feet distance between adjacent clearcuts to provide secure travel corridors for wildlife. Thinning and prescribed fire treatments may occur within some of the corridors, while others would remain untreated. Old growth, areas with closed canopy or with substantial quantities of coarse woody debris would be targeted and incorporated into reserve areas between treatments and areas containing important wildlife habitat features such as squirrel middens.

### Thinning

The other 75% of the lodgepole pine acres (approximately 7,110 acres) within the treated area would be thinned to varying degrees. Again, stands with >35% DHC would be identified (by trained personnel) and excluded from treatment in order to preserve quality lynx habitat. The following guidance and constraints would be used in treating lodgepole pine on all remaining acres outside of the openings (approximately 7,110 acres are identified for thinning):

1. In lodgepole pine stands, reduce basal area to an average of 80 – 120 square feet per acre. Overall, basal area may differ substantially from one point to another. Some areas may require multiple treatments in order to achieve the basal area goal, without causing blowdown concerns within the stand.
2. Preference would be given to retaining other species (spruce, fir, aspen) over lodgepole pine. The spacing would be variable.

3. Trees would be thinned in a manner to create clumps or cohorts of trees intermingled with small, irregular openings or areas of lower tree density. Pockets of dwarf mistletoe-infected trees and lodgepole interspersed with aspen would be targeted for removal to create openings and provide for species diversity.
4. Slash left on-site would be generally lopped and scattered, piled and burned, or disposed of by other means. Broadcast burning may take place in 25 - 50 percent of thinned areas (up to 3,555 acres).
5. Opportunities for firewood gathering by the public would be provided.
6. Pre-commercial thinning of currently young lodgepole pine stands may take place on approximately 345 acres of the 7,110 thinning acres of lodgepole pine.
7. Prescribed fire could be used in most areas that have been treated mechanically or by hand, or it could be used as a treatment by itself. The exact burn treatment to be used and their locations would be determined after mechanical vegetation treatments are completed, and would depend on the level of natural and activity fuels in each stand, slope, soil type, and other related factors.

### **TREATMENTS IN ASPEN**

In addition to creating openings and thinnings within lodgepole pine stands, 25% of treatable aspen (acres not limited by slope, accessibility etc.) within the project area would be harvested. This would result in approximately 115 acres of aspen, out of 455 treatable aspen acres, that would have openings created in them. The methods of implementation and burning criteria stated above for lodgepole pine apply here as well.

### **TREATMENTS IN SAGEBRUSH AND MEADOWS**

Treatments for both meadows and sagebrush would include the removal of encroaching conifer trees. Prescribed burn treatments would only be used in meadows in order to stimulate grass/forb production while preserving sagebrush communities. Because sagebrush can take decades to return after a fire, no prescribed burns will take place where sagebrush is present.

### **TREATMENTS IN SPRUCE AND FIR**

In the transition area between lodgepole pine and spruce/fir where the understory is underdeveloped, the objective of vegetation management would be to remove mature lodgepole pine to promote regeneration. These areas would receive "un-even" aged management treatments (patch cuts and single tree selection) to maintain or promote horizontal diversity within the stand. Individual treatment units would be between 0.1 and 5 acres. Areas that contain both substantial amounts of down, woody debris and high (35% or greater) horizontal cover would be retained and not impacted directly. Only in the event that spruce beetle or other insects and diseases impact spruce forests, would the following treatments in spruce be allowed: salvage of dead trees, removal of trees infested with beetles, and removal of green trees for skid trails, temporary roads or where trees will blow over. There would be no green trees harvested in spruce/fir except for in the skid trails or temp roads in order to access the dead trees. Currently, there are only very limited spruce/fir areas within the project area that are being impacted by insect or disease; this salvage treatment proposal would only be implemented should the need arise in the future due to epidemic infestations. The entire 16,450 acre project area includes approximately 1,550 acres of spruce. Up to 90% (1,395 acres) of the spruce/fir would be salvaged if insects and/or disease kill these



stands; 10% would be left for lynx denning habitat. These reserve areas would be identified by and coordinated with the wildlife biologist to ensure the best possible denning habitat is retained (areas near high quality foraging habitat, stands on north or east aspects etc.). Where appropriate, pile burning would be used to treat slash. Broadcast burning would not take place in spruce/fir stands.

#### Ski Cooper Boundary Only

Only inside the Ski Cooper boundary would green tree harvest take place in spruce/fir stands consisting of group and individual tree selection treatments and would be designed to develop multi-aged, multi-storied stands. In addition, where multiple species occur, treatments will be designed that attempt to maintain or increase the number of species present within any particular stand. Where appropriate, pile burning would be used to treat slash. Broadcast burning would not take place in spruce/fir stands.

The table below summarizes all acres of treatment within the project area for Alternative 1. It should be noted that the 1,395 acres of spruce/fir that would be treated should a spruce beetle epidemic arise, could actually be any combination of clear-cuts and thinnings, but it is not predictable at this time. These 1,395 acres would be the maximum amount salvaged (if all spruce/fir within the project area was killed including all spruce/fir inside the Ski Cooper boundary) but likely would be less. If insect and disease *does not* impact the spruce/fir forests, the only treatment in spruce/fir stands would be inside the Ski Cooper boundary (300 acres of spruce/fir). The green tree harvest inside the ski area boundary would consist of group and individual tree selection and treatments would be designed to develop multi-aged, multi-storied stands.

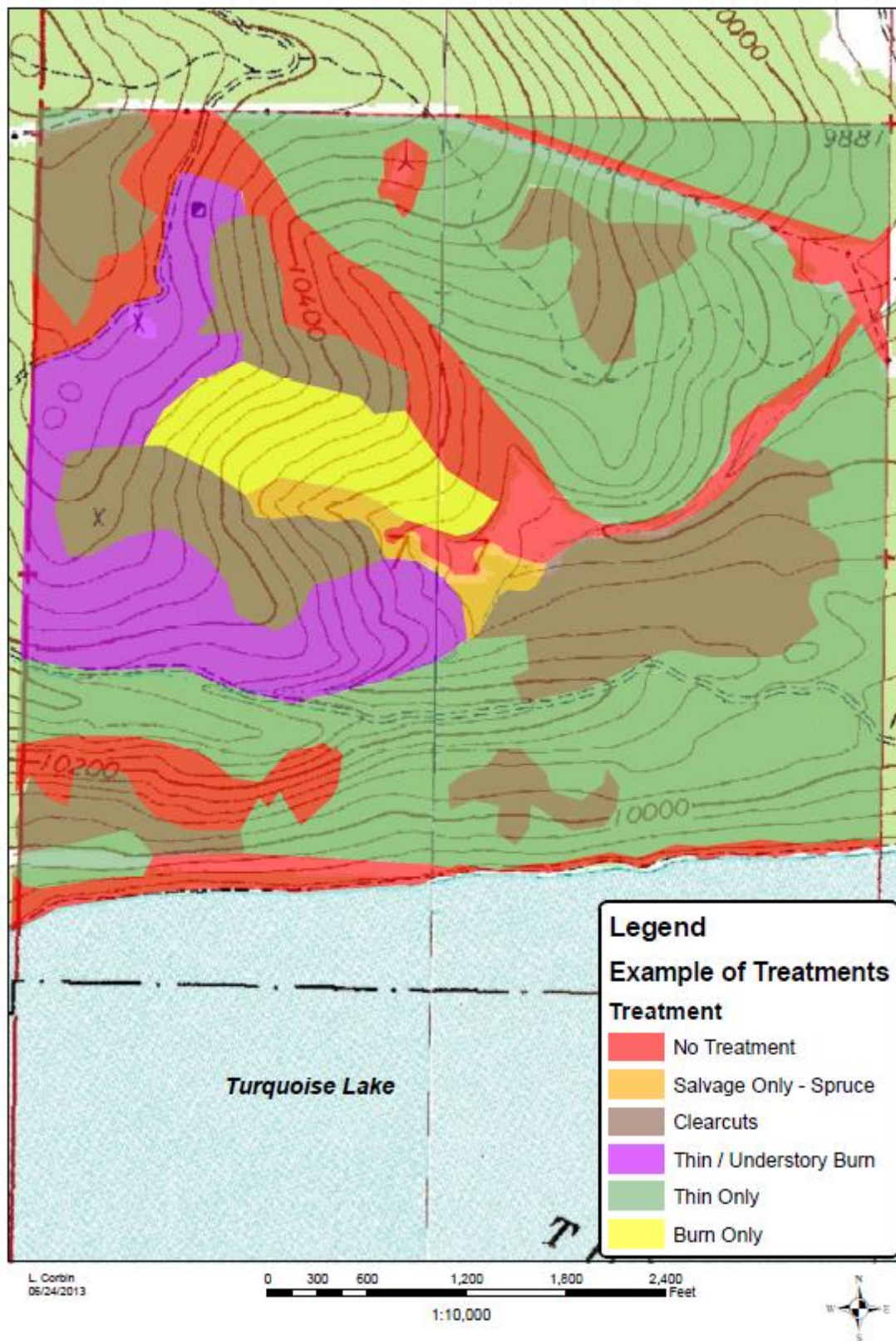
**Table 2.** Maximum acre harvest summary for Alternative 1.

TYPE	Total treatable acres	% treating	Remaining treatable acres	Clear Cuts Project Area	Thinning Project Area (precommercial included)	Clear Cuts Tenn Pass LAU	Thinning Tenn Pass LAU	Clear Cuts Massive LAU	Thinning Massive LAU
Lodgepole	9,480	100	9,480	2,370	7,110 (345)	1,100	3,300 (40)	1,270	3,810 (305)
Aspen	455	25	115	115	0	58	0	57	0
Spruce/Fir	1,550	90	1,395	0	1,395	0	780	0	615
TOTAL PROJECT	13,580	96	10,990	2,485	8,505 (345)	1,158	4,080 (40)	1,327	4,425 (305)

The timeline for implementation is stretched out over the next 10 years and treatment locations would be scattered throughout the entire project area. Meaning, all the clear cuts would not be implemented all in one location, all at the same time; rather scattered throughout the 16,450 acre project area over a 10 year time period.

Because exact treatment areas are not predetermined, an example map of what treatments would look like on the ground has been created and is shown below. This is not necessarily what would be implemented on this piece of land; rather this is to show how clear cuts, thinnings, and reserve areas would interplay between one another.

**Map 3.** Example of treatments in the Tennessee Creek Project area.



## OTHER ACTIONS

Planting tree islands within runs inside the Ski Cooper boundary would be encouraged. Cones would be collected from local sources, germinated at a Forest Service nursery and would be available for use in establishing young islands of trees within existing runs. Ski Cooper, in coordination with the Forest Service, could determine the best placement of these groups. However, it is suggested that they be placed below existing tree islands, where appropriate, to help provide seedlings with protection from skiers while they develop.

To improve aquatic organism passage, culverts that prevent movement of aquatic organisms would be reinstalled, removed or replaced with an appropriately sized and type of conveyance (standard culvert, bottomless arch culvert, etc.). Heavy equipment would be used and the appropriate permits would be obtained from the U.S. Army Corps of Engineers. Boulders, trees, and other native materials may also be used during installation or to rehabilitate the area.

To protect and improve riparian ecosystems, non-system routes and dispersed campsites that are near or go through riparian areas may be closed. Treatments include ripping, seeding, bouldering, fencing or other methods that would restrict access. Heavy equipment may be used.

To improve erosion and compaction issues at designated camp sites (campgrounds), identified areas would be ripped (breaking up compaction), contoured, mulched, seeded, and/or have erosion control netting installed as needed. Both hand and mechanical treatments may be utilized.

Snags would be created for cavity-dependent wildlife (birds, bats, etc.) in areas where minimum snag requirements are lacking. Trees would be killed through girdling, fire, or other methods to create snags for cavity-dependent species.

Nesting platforms may be constructed and placed along the shoreline of Turquoise Lake to provide additional nesting opportunities for raptors (i.e. osprey, bald eagles). To create the nesting platforms, trees may be topped or poles installed in specified locations. Heavy equipment would be used to place platforms and would coincide with an ongoing vegetation project in the same area to minimize any additional disturbance of heavy equipment use.

Utilize natural river restoration techniques to improve sediment transport and aquatic habitat on Halfmoon Creek from the confluence of Elbert Creek and Halfmoon Creek downstream to the U. S. Geological Service gaging station on Halfmoon Creek. The restoration effort would utilize granitic boulders, whole trees, and other native materials to mimic natural stream features, and may include full channel spanning cross vanes, J-hook vanes, habitat trees, and micro vortex in channel features. Bank full riparian benching and stream bank toe slope stabilization would be accomplished utilizing toe wood, full length trees, transplanted willow and sedge. Also within the Halfmoon drainage, a degraded road-water crossing upstream of the confluence of South Halfmoon Creek and Halfmoon Creek would be stabilized. The crossing has overwidened over time and requires stabilization to reduce sedimentation input from the road and to improve aquatic organism passage through the crossing. Natural river

design treatments would be applied here as well. Heavy equipment would be used for the project. Boulders, trees, and other native materials may be used for stabilization and restoration. Additional engineered plans and appropriate site visits by specialists and recommendations for each resource would be attained before any re-construction would take place.

Forest Service system road (FSR) 109, the Mt. Zion road, could require substantial maintenance in order to accommodate the size and load requirements of logging traffic. The Mt. Zion road currently has a sharp corner section that could need to be modified for larger log trucks but overall mileage of the road would not change. There could be up to one acre of disturbance to accomplish this modification. Should this road require substantial maintenance, engineered plans, specialist site visits and further design criteria recommendations (if deemed necessary) would be provided. Other roads within the project boundary may also require basic maintenance such as: culvert cleaning or replacement, and water bar or rolling dip reshaping where needed.

### 4.3 Alternative 2

In addition to the previously stated ongoing actions listed in section 4.1 *No Action Alternative*, the following actions are proposed.

Alternative 2 for the Tennessee Creek Project is very similar to Alternative 1 (the proposed action). The percentage of treatable acres of lodgepole that are designated as openings versus thinnings is different. Treatments that resulted in creating or augmenting existing openings in lodgepole pine would not exceed 40% of treatable lodgepole acres (3,790 acres) compared to 25% treatment (2,370 acres) in Alternative 1. The acres of thinning forested areas is also different. For Alternative 2, the acres of thinning would be substantially less than those for Alternative 1 (7,110 acres); approximately 3,030 acres would be thinned and treatment areas would be concentrated around areas adjacent to Turquoise Lake, ditches associated with water rights, and areas within the wildland urban interface.

The acres of treatable aspen that would be designated for openings would also increase to 40% (180 acres) versus the 25% (115 acres) proposed in Alternative 1. The spruce/fir components would be the same. Table 3 below summarizes species specific proposed acres for Alternative 2 and Table 4 compares totals acres treated between both alternatives.

**Table 3 .** Acre harvest summary for Alternative 2.

TYPE	Total treatable acres	% treating	Remaining treatable acres	Clear Cuts Project Area	Thinning Project Area (precommercial included)	Clear Cuts Tenn Pass LAU	Thinning Tenn Pass LAU	Clear Cuts Massive LAU	Thinning Massive LAU
Lodgepole	9,480	72	6,820	3,790	3,030 (345)	1,760	780 (40)	2,030	2,250 (305)
Aspen	455	40	180	180	0	90	0	90	0
Spruce/Fir	1,550	90	1,395	0	1,395	0	780	0	615
TOTAL PROJECT	11,485	73	8,395	3,970	4,425(345)	1,850	1,560 (40)	2,120	2,865 (305)



**Table 4 .** Comparison of total acres treated in Alternative 1 (proposed action) and Alternative 2

	Alternative 1 (Proposed Action)	Alternative 2	Acre Difference
Total Acres Treated	11,060	8,395	-2,665
Acres Clear Cut	2,485	3,970	+1,485
Acres Thinned	8,505	4,425	-4,080

All other proposed activities in Alternative 2 are the same as those proposed for Alternative 1 (erosion control at campgrounds, stream restoration etc.)

## 5.0 PROJECT DESIGN CRITERIA

The following design criteria are part of the proposed action and would be incorporated should the proposal be approved. These criteria are common to both Alternatives 1 and 2 and are those pertinent to wildlife. For a complete list of design criteria, see the *Environmental Assessment for The Tennessee Creek Project* (U.S. Forest Service 2013) on file at the Leadville District office.

1. All new nesting/denning sites for threatened, endangered, or Forest Service sensitive species observed prior to or during implementation will be reported immediately to the Wildlife Biologist and appropriate protection measures will be implemented.

### SNAGS AND COARSE WOODY DEBRIS

Snags and recruitment snags are to provide for nesting, roosting, and foraging habitat for small mammals and birds such as bats, woodpeckers, owls, songbirds, etc. (These criteria do not apply to fuel breaks if they would compromise the integrity of the fuel break).

2. Maintain a *minimum* of 80 snags per 10 acre average of varying and large diameter size class. Guidelines for snags include:
  - a. Retain all soft snags (class 3, 4, and 5) except for safety hazards (Forest Plan, pg. III – 12) to the greatest extent reasonable and practical.
  - b. Retain all hard snags (when they are present) in the largest size class available (pre-treatment) to meet the above targets.

*If above existing snag levels are not available, provide for green recruitment snag trees sufficient to bring snag/recruitment snag levels up to the above mentioned target levels in a well distributed manner of both clumps and individual trees, of largest available trees. Trees with defects (e.g. “wolfy” appearance, dead tops, forked tops, cankers, heartrot, diseases, broken tops, and large limbs) would be selected when possible. Where practical, create new snags by girdling, burn plan design, or other means, as necessary to achieve target numbers of snags. Clumping (versus even spacing) of snags and recruitment trees is preferable if desired snag species and larger dbh snags are available for the snag retention clump. Locate snag patches adjacent to green trees to provide additional cover for wildlife species.*

3. Assure that adequate coarse woody debris (CWD) is retained for wildlife use and nutrient recycling following mechanical and prescribed fire treatments by

- retaining an average of at least 200 linear feet of the largest diameter wood available per acre where feasible. In areas where the prescription includes pile burning, some piles would be left in each treatment area for wildlife habitat and to supplement a stand deficient in CWD.
4. The snag and CWD requirements should be retained through all treatment phases (commercial operations, fuelwood, and prescribed fire) with the realization that some existing snags may become CWD, retention trees may become snags, and CWD may be unintentionally consumed during implementation (due to wind throw, fire, etc.)
  5. Whole trees and other wood utilized for aquatic habitat enhancement would be harvested using techniques developed by the Pike & San Isabel NF "Trees for Trout" initiative (2005-2012) on the South Platte River to limit soil disturbance and promote vegetation regrowth.

#### BIRDS

**\*Unless consulted and agreed upon by the wildlife biologist, the following criteria will be adhered to:**

6. Because raptors nest in late winter and early spring and they can change nest locations annually, all proposed treatment areas shall be surveyed for raptors and other nesting birds by a Wildlife Biologist to determine whether raptors are present and actively nesting. If new nests are discovered, restrictions discussed below would be implemented.
7. An activity exclusion area consistent with the *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors* around any active raptor nest (Colorado Division of Wildlife 2008) or TES bird species will be marked by the Wildlife Biologist and avoided (generally from March 1 to September 15). Buffer zone size and restriction dates will vary depending on species.
8. Active northern goshawk nests (any primary or alternate nest within a territory that has been utilized within the last 5 years) will be buffered by ½ mile radius for no disturbance from March 1 to September 15. A *minimum* 30 acre nest area will be delineated around the best habitat available, that includes each nest tree, and will be excluded from any harvesting activity.
9. To the extent practical and feasible, restrict prescribed burning from May 1 to August 15 in order to avoid disrupting migratory bird nesting and breeding.
10. Do not cut any trees that have evidence of being used as a nest tree (i.e., presence of constructed, natural or excavated nesting cavities, fecal whitewash, feathers,

bolus pellets, skeletal bones, or fur of prey species present at or around the base of a tree).

## BIG GAME

11. In forested areas, maintain a 200 foot deer and elk hiding cover buffer along 75% or more of each side of arterial and collector roads (Forest Plan, pg. III – 153). Arterial and collector roads in the project area include FSR 100 Wurts Ditch Road, FSR 105 Hagerman Pass, and FSR 110 Halfmoon Road. Treatments would be allowed in the cover buffer as long as hiding cover is maintained.
12. To protect big game (mule deer, elk, bighorn sheep, and moose) critical winter range, winter range, and winter concentration areas seasonal restrictions for timber harvest and associated activities will be implemented on winter range within the project area from December 1 to April 15. Prescribed burning activities may be acceptable during this time period and will be coordinated with the Wildlife Biologist.
13. If conflicts with other species protection measures prohibit effectively operating during the summer months in an area (restrictions for raptor nest sites, etc.), timber harvest operations may take place on elk, deer and moose (not bighorn) winter range during the restriction period IF *both* of the following criteria are met:
  - a. A locked gate will be placed at the entrance to temporary roads used to access a treatment area to prohibit all motor vehicle access (except for authorized administrative use – FS personnel and timber contractors).
  - b. Only 20% of the mapped winter range will be operated on during the restriction dates to allow big game to utilize the other 80% during this time. This would allow up to approximately 375 acres of treatment per year in elk/ deer winter range during the restriction periods and up to 180 acres of treatment per year in moose winter range.
14. Avoid disturbing elk calving and mule deer fawning concentration areas from May 15 to June 30.
15. In general, no treatments would be allowed in the water influence zone (WIZ) and these riparian areas, including kettles holes, would be buffered up to 100 feet on each side of the WIZ. A site visit by the Hydrologist, Fisheries or Wildlife Biologist may allow flexibility if it is determined a smaller buffer may be appropriate. Prescribed fire may occur in the WIZ, but direct ignition would not occur in these zones. Pile burning would not be allowed in the WIZ.
16. If boreal toad breeding sites are discovered during the life of this project, a 300 foot no treatment buffer would be put in place surrounding the breeding ponds.

17. Before heavy equipment and vehicles would be allowed to cross streams, an aquatic biologist and/or hydrologist will be consulted to determine where crossings would occur or be constructed, and to specify any stipulations necessary to minimize negative impacts on aquatic resources. Heavy equipment and vehicles will not be allowed in streams during fish spawning, incubation, and emergence periods. These restricted periods will be determined by the fisheries biologist prior to project implementation.
18. To reduce risk of spreading noxious weeds, heavy equipment and vehicles will be cleaned and inspected prior to entering the project area and all mud, dirt, and plant parts will be removed according to Region 2, *Guide to Noxious Weed Prevention Practices*.
19. Treatment areas will be monitored pre- and post-treatment (two years post-project completion) for noxious weeds. Weed locations identified will be scheduled for treatment by the Noxious Weed Coordinator.
20. Only certified weed-free Forest Service approved native grass/forb seed mixes will be used for re-vegetation efforts.
21. Temporary roads will generally be closed within 5 years after the mechanical work has been completed. This will allow prescribed fire treatments (broadcast burning) to be completed prior to the road closures.

## **6.0 PREFIELD REVIEW**

The Colorado Natural Heritage Program database (Colorado Natural Heritage Program (CNHP) 2012) and district files (U.S. Forest Service 2013) were reviewed to identify element occurrence records within the Action Area. There were several observations of various species ranging from historic to recent including those for bighorn sheep, boreal toad, elk, Brewer's sparrow, northern goshawk, Canada lynx, wolverine and American marten. There was a confirmed sighting of a river otter (2011) on the district but not within the project boundary. The Tennessee Creek project area was surveyed in 2011 and 2012 for owls (limited coverage), boreal toads, bats and northern goshawks. Goshawk surveys were completed throughout the entire project area for two consecutive years. The project area has had limited surveys for other TES/MIS species and for this analysis, presence is assumed in suitable habitat where adequate surveys have not been completed.

## **7.0 FOREST SERVICE SENSITIVE SPECIES AND MANAGEMENT INDICATOR SPECIES**

The Region 2 Sensitive Species list (U.S. Forest Service 2011) which includes the San Isabel and White River NFs, was reviewed for FS sensitive species as well as each forest's management indicator species lists (US Forest Service 2005) and (U.S. Forest



Service 2006). The Leadville and Eagle-Holy Cross Ranger districts are within the same region and therefore have the same FS sensitive species identified. Management Indicator Species are designated by forest and therefore there are two separate lists for those. Using these lists, it was determined which of those species had a potential to occur within the administrative boundaries. Species not known or with no potential of occurring on the Forest are documented with rationale in: *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forests* (Wrigley 2012). A list of species known or with a potential to occur or be affected by the proposed alternatives, as shown in the table below, will be assessed. Those marked with no potential to occur will not be discussed further in this document. Excluded species have been dropped from further analysis by meeting one or more of the following conditions:

1. species does not occur nor is expected in the project area during the time period activities would occur;
2. occurs in habitats that are not present; or habitat not affected by project
3. project is outside of the geographical or elevational range of the species.

In addition, table 5 below also gives a very brief summary of candidate species, Forest Service sensitive species, and management indicator species habitat requirements and known occurrence information of species which are known to or may occur on the Districts and/or Forest. For a more detailed species account, including natural history, habitat requirements, status, and background information for each species please refer to *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forest* (Wrigley 2012) which can be found on file at the Leadville District office.

### **7.1 Species Considered and Evaluated**

Forest Service sensitive and management indicator species with the potential to occur within the Analysis Area on the San Isabel and/or the White River National Forest (Forest) are listed below in Table 5. For more species information, please refer to *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forest* (Wrigley 2012). Species that are on the candidate list for the FWS, are automatically listed as Forest Service sensitive species. However, any candidate species has been addressed along with any threatened or endangered species in a separate but related document, *Biological Assessment for the Tennessee Creek Project* on file at the Leadville Ranger district office.

**Table 5.** Candidate/proposed, Forest Service sensitive and Management Indicator species with potential to occur within the Analysis Area. Fish and plants are analyzed in a separate document. **SINF**=San Isabel National Forest; **WRNF**= White River National Forest

<sup>1</sup>**Status Codes:** **C**= Federally candidate/proposed for listing; and **S**=Forest Service sensitive;

**MIS**=Management Indicator Species

<sup>2</sup>**Exclusion Rationale Codes:** **ODR**=outside known distributional range of the species; **HAB**= no habitat present in Analysis Area; **ELE**= outside of elevational range of species; **INV**= presence of non-native salmonids.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS <sup>1</sup>	POTENTIAL TO OCCUR?	RATIONALE FOR EXCLUSION <sup>2</sup>	BRIEF HABITAT DESCRIPTION AND RANGE IN COLORADO
<b>INVERTEBRATES</b>				
Susan's purse making caddis fly <i>Ochrotrichia susanae</i>	S		ODR	springs and seeps found in Chaffee and Park Counties
Hudsonian emerald <i>Somatochlora hudsonica</i>	S		ODR	seven known locations in Colorado, all within a 40-mile radius of Boulder. Boggy wetlands, springs, & ponds with muddy bottoms are potential breeding sites
Rocky mountain capshell snail <i>Acroloxus coloradensis</i>	S		ODR	littoral zone of oligotrophic and mesotrophic mountain lakes with neutral to slightly alkaline water and high dissolved oxygen content; 8,800-9,800 ft.
Nokomis fritillary butterfly <i>Speyeria Nokomis fritillary</i>	S		ODR	Permanent spring-fed wetlands/soggy soils & shade supporting bog violet ( <i>Viola nephrophylla</i> ) in arid environments <7500' elevation, butterfly & host plant not known to occur in Eagle or Lake county.
<b>AMPHIBIANS AND REPTILES</b>				
Boreal toad (western toad) <i>Anaxyrus boreas boreas</i>	S	X		breeds in ponds & over winter in refugia within lodgepole pine, spruce-fir forests, & alpine meadows; 7,500-12,000 ft.
Northern leopard frog <i>Lithobates pipiens</i>	S	X		banks & shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds & streams, especially those with rooted aquatic vegetation up to 11,000 ft.
Plains leopard frog <i>Lithobates blairi</i>	S		ELE	margins of streams, natural and artificial ponds, reservoirs, creek pools, irrigation ditches and other water bodies in plains grassland, sandhills, stream valleys, or canyon bottoms; elevations below 6,000 ft.
<b>BIRDS</b>				
American peregrine falcon <i>Falco peregrinus anatum</i>	S		HAB	wide variety of habitats, selects cliff ledges or rock outcroppings for nesting, preferring high, open cliff faces that dominate the surrounding area.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS <sup>1</sup>	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION <sup>2</sup>	HABITAT DESCRIPTION AND RANGE IN COLORADO
American Pipit <i>Anthus rubescens</i> (WRNF MIS)	MIS	X		open-country birds in all seasons. They breed in alpine areas, near seeps, streams, lakes, or wet meadows. During migration and winter, they come down into the lowlands and can be found on beaches, marshes, agricultural fields, short-grass prairies, and mudflats.
Bald eagle <i>Haliaeetus leucocephalus</i>	S	X		near open water including rivers, streams & lakes, nesting & roosting in large ponderosa pine, Douglas-fir, or cottonwood trees in proximity to open water and rivers.
Black swift <i>Cypseloides niger</i>	S		HAB	nests on cliffs near or behind high waterfalls.
Boreal owl <i>Aegolius funereus</i>	S	X		high elevation, subalpine mature & old-growth coniferous woodlands, including mature Engelmann spruce, subalpine fir or spruce/fir-lodgepole pine forests, interspersed with meadows, nesting in cavities in trees larger than 15 inches dbh.
Brewer's sparrow <i>Spizella breweri</i> (WRNF MIS)	S, MIS	X		Sagebrush, mountain meadows, and mountain shrub habitat in CO.
Columbian sharp-tailed grouse <i>Tympanuchus phasianellus columbianus</i>	S		ODR, HAB	Sagebrush/mountain shrub communities with >40% cover, short sparse bunchgrasses on knolls 6200' to 8500' elevation, not known to occur in Eagle or Lake county
Ferruginous hawk <i>Buteo regalis</i>	S		HAB	Flat rolling prairies semi-desert shrub-steppe, low elevation, 3000' to 9500' elevation
Flammulated owl <i>Otus flammeolus</i>	S	X		old-growth or mature ponderosa pine, ponderosa pine, & Douglas-fir forests, often mixed with mature aspen, nesting in cavities, feeding on insects.
Greater sage-grouse <i>Centrocercus urophasianus</i>	S		HAB, ODR	Sagebrush obligate with grass/forb understory in rolling or mountainous terrain, with water nearby in spring 4500' - 9000' elevation
*Gunnison sage grouse <i>Centrocercus minimus</i>	C, S		HAB ODR	tall dense stands of sagebrush near wet meadows with tall grasses for hiding; occurring primarily in SW & W CO, but also including Saguache & S Chaffee County.
Lewis' woodpecker <i>Melanerpes lewis</i>	S		HAB	lowland & foothill riparian forests, agricultural areas, urban areas with tall deciduous trees, & foothills including Wet Mountains & grasslands
Loggerhead shrike <i>Lanius ludovicianus</i>	S		HAB	open riparian areas, montane meadows, agricultural areas, grasslands, shrublands, & piñon/juniper woodlands in western valleys in E CO

SPECIES COMMON AND SCIENTIFIC NAME	STATUS <sup>1</sup>	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION <sup>2</sup>	HABITAT DESCRIPTION AND RANGE IN COLORADO
Northern goshawk <i>Accipiter gentilis</i>	S	X		primarily forest habitat, especially in mountains, nesting in lower portions of mature Douglas-fir, ponderosa pine, lodgepole pine, or aspen canopies; prefers mature or old-growth forest structure.
Northern harrier <i>Circus cyaneus</i>	S		HAB	spring & fall migrant in western valleys mountain parks, and eastern plains in CO inhabiting grasslands, agricultural areas, marshes & tundra in fall; 3,500-13,000 ft.
Olive-sided flycatcher <i>Contopus cooperi</i>	S	X		mature spruce-fir & Douglas-fir forests, especially on steep slopes or near cliffs, near bogs & meadows during the summer, 10,000-11,000 ft.
Purple martin <i>Progne subis</i>	S		ODR	Late-seral aspen near meadows and water <9000; elevation, secondary cavity nests in aspen
Sage sparrow	S		HAB	Contiguous big sagebrush & sage/greasewood 103; height, 1+ layers grasses and forbs <8200' elevation
Virginia's Warbler <i>Vermivora virginiae</i> (WRNF MIS)	MIS		HAB, ELE	this species nests in summer in drought-tolerant pinyon/juniper and oak woodlands; It nests in or near coniferous forests usually between 6,000 and 9,000 feet. Needs dry landscapes with dense shrub cover for breeding
White-tailed ptarmigan <i>Lagopus leucurus</i>	S		HAB	Inhabit alpine tundra with moist, low-growing alpine vegetation, particularly willows ( <i>Salix</i> spp.), with boulders, in proximity of water.
Yellow-billed cuckoo (eastern subspecies) <i>Coccyzus americanus</i>	S		ODR	Eastern subspecies: riparian forests along the Arkansas River & urban areas with tall trees; a rare to uncommon spring & fall migrant & summer resident of E CO & SW KS
<b>MAMMALS</b>				
Abert's squirrel <i>Sciurus aberti</i> (SINF MIS)	MIS		HAB	closely associated with, and nearly confined to cool, dry interior ponderosa pine forests. <sup>1</sup>
American marten <i>Martes americana</i>	S	X		spruce-fir & lodgepole pine mature to old-growth forests with moderate to high density canopy closures & abundant snags & logs; 8,000- 13,000 ft.
Cave Bats (WFNF MIS)	MIS		HAB	Bat species that roost or hibernate in caves.
Common hog-nosed skunk <i>Conepatus leuconotus</i>	S		HAB ODR	grasslands & foothills, prefers partly wooded, brushy, rocky area; SE & south-central CO.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS <sup>1</sup>	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION <sup>2</sup>	HABITAT DESCRIPTION AND RANGE IN COLORADO
Elk <i>Cervus canadensis nelsoni</i> (SINF and WRNF MIS)	MIS	X		Coniferous forests associated with rugged, broken terrain or foothill ranges; summertime spent in high mountain meadows
Fringed myotis <i>Myotis thysanodes</i>	S		ELE	rocky outcroppings in mid-elevation ponderosa pine, piñon/juniper, oak, & mixed conifer woodlands, and pine forests grasslands, deserts, & shrublands; Baca, El Paso, Huerfano, Las Animas, Otero, & Pueblo counties. Up to 10,000 ft. elevation
*Gunnison's prairie dog <i>Cynomys gunnisoni</i>	C, S		HAB ODR	shrub-grassland habitats in SW CO in mesic plateaus and intermountain valleys, benches, and arid lowlands.
Hoary Bat <i>Lasiurus cinereus</i>	S	X		roosts on trees hidden among foliage, but on occasion in caves with other bats – it prefers coniferous forests and hunts over open areas or lakes
*North American Wolverine <i>Gulo gulo</i>	C, S	X		alpine & subalpine mature/intermediate timbered areas around natural openings, including cliffs, slides, basins, & meadows, dependant on ungulates, historically in CO, extending the length of the Rocky Mts.
Pygmy shrew <i>Sorex hoyi</i>	S	X		occupies a wide variety of habitats in the mountains of CO at elevations above 9,600 ft., such as subalpine forests, edges of meadows, bogs, willow thickets, aspen-fir forests, and parklands.
River otter <i>Lontra canadensis</i>	S	X		occurs in streams, lakes, reservoirs, wetlands and marine coasts; reintroduction efforts occurred in the upper reaches of both the Arkansas and Platte Rivers in the 1970s.
Spotted bat <i>Euderma maculatum</i>	S		ODR, ELE	Desert specialist, cliffs, structures, tree cavities, arid <6000' elevation
Rocky Mountain bighorn sheep <i>Ovis canadensis canadensis</i>	S	X		prefers semi-open, precipitous terrain characterized by a mixture of steep and gentle slopes, broken cliffs, rocky outcrops, and canyons
Townsend's big-eared bat <i>Plecotus townsendii</i>	S		ELE	typically associated with caves & abandoned mines for day roosts & hibernacula, will also use abandoned buildings in western shrubland, piñon/juniper woodlands, aspen, spruce/fir/, lodgepole & open montane forests in elevations up to 9,500 ft.

\*These species that are designated as Forest Service sensitive species as well as candidate species to be listed as threatened or endangered are addressed in the separate but related document, *Biological Assessment for the Tennessee Creek Project* and can be found on file at the district office. They will not be analyzed here.

Only those Forest Service sensitive species with the potential to occur (i.e., habitat is present) within the Analysis Area or be affected by the proposed alternatives are

addressed hereafter in this assessment (evaluated species). Species shown in the table above as excluded will not be analyzed further based on the rationale provided here and in Wrigley et al. (2012). The proposed alternatives will have no effect/impact to those species.

## **7.2 Evaluated Species Information**

Each species will be discussed briefly before each analysis in its corresponding section. See Wrigley et al. (2012) for more detailed species account information for the FS sensitive and MIS species analyzed further in this document.

## **7.3 Field Reconnaissance**

Informal field reconnaissance of the project area has occurred during interdisciplinary team member field visits in summer of 2011 and 2012. Limited boreal owl surveys were conducted by district biologist, Jeni Windorski, in the spring of 2012 in potential boreal owl breeding habitat of the project area. No boreal owls were recorded. Northern goshawk surveys were conducted during June-August of 2011 and 2012 throughout the entire project area by wildlife technicians Taylor Elm and Eddie Love and district biologist, Jeni Windorski. Two new territories were discovered along with several alternate nests to known territories. Monitoring of these territories continued in 2013. Surveys were also conducted throughout the entire project area for boreal toads and northern leopard frogs, where suitable habitat exists. There are boreal toad breeding sites on the district but no known sites within the project area. No new breeding ponds or observations were discovered or recorded for boreal toad or northern leopard frog. Acoustical and visual bat surveys were completed with *Song Meter* (SM2) detectors near abandoned mines within the project area, but no new roosting or maternity sites were discovered inside the project area. Many of the abandoned mines that were identified in pre-field reviews as suitable survey areas were discovered to be closed with concrete plugs. In addition to formal surveys, incidental observations of American marten, bighorn sheep, and Brewer's sparrow confirm presence and use within the project area by these species. Specific surveys were not conducted for other species analyzed, therefore, where suitable habitat exists, presence is assumed.

## **8.0 ENVIRONMENTAL BASELINE**

This section in combination with the separate document *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forests* (Wrigley 2012) defines the current status of these species and their habitat and provides a platform to assess the effects of the proposed action. The LRMP identifies past and planned FS activities on the PSICC, which includes the San Isabel and White River National Forests. In addition to the activities identified below, please refer to both LRMPs for additional information regarding federal actions on the Forest. Future actions and their potential effects are not included in the environmental baseline. Many of these are ongoing activities can be also considered as cumulative effects and are applicable to the cumulative effects analysis in the *Effects to Species* (Section 9.0) below.



## 8.1 Past and Current Activities within the Analysis Area

The following past and ongoing actions are part of the environmental baseline. The effects they have on the species addressed in this assessment are added to the direct/indirect effects of this project to assess the cumulative effects of the proposed project. The following is a summary of specific activities that have occurred within the analysis area that may affect species. Each of the below activities have incrementally impacted wildlife species directly and indirectly, through fragmentation, habitat loss, loss of habitat connectivity affecting movement and loss of habitat effectiveness through these anthropogenic activities.

- *Historic Mining Activities* - Historic mining activities have had impacts on many species and are responsible for shaping the landscape and vegetation today. Historic uses of the Forest included intensive use by miners, market hunters, and trappers. During the mining boom in Colorado, many backcountry locations contained railroads and established towns with year-round human populations. Mining has caused alteration of habitat, leaching of heavy metals in to streams changing stream pH, erosion, and sedimentation into streams. Activities associated with mining that affect species include road and railroad development, timber harvest, weed invasion, and revegetation efforts. Much of the mixed conifer was harvested for mining timbers, fuelwood, and charcoal. Snags and CWD that provide important habitats were also harvested for fuel which are lacking today. Many of the large diameter trees were removed. Within some areas, only lodgepole and aspen were regenerated, reducing species diversity.
- *Fire suppression* - Fire suppression has led to increased fuel loading and canopy closure. Fire suppression has prevented natural thinning of the predominately lodgepole stands and limited tree growth. These small, dense lodgepole stands are now relatively homogenous and are more susceptible to abnormal levels of insect and disease populations and tree mortality. Few snags were created as a result of fire suppression and existing snags were harvested for fuel. These historic activities combined to produce a forest that has smaller trees, less structure (snags and CWD), less species diversity, and a low stand age diversity (more older stands).
- *Timber harvest/Hazardous Fuels Removal* – Vegetation management (thinning, group selection, patch cuts, and chipping of slash) within the foot print of the campgrounds/developed sites at Halfmoon Creek and Turquoise Lake are ongoing. Annual treatments in these areas average 7 – 10 acres per year. *Northwest Leadville Hazardous Fuel Project* continues on a limited scope. Treatments would include pre-commercial thinning, thinning of mature stands, and pile burning with annual treatments averaging 10 – 20 acres per year for the next 3 years. Small scale timber removal occurs occasionally on private lands.
- *Grazing*- Grazing leads to biomass removal and trampling. It has led to changes in species composition, compaction of soils, changes in fuel loading and the fire regime, downcutting of riparian areas with subsequent drying of adjacent meadows, and noxious weed invasion. Within riparian areas and wet meadows livestock grazing has led to churning of the soil and hummocking. Grazing was

widespread in the early 1900's on the Forest and adjacent lands. There are no active grazing allotments within the Tennessee Creek Project area.

- *Recreation* – Motorized touring (i.e., automobiles, four-wheeled drive vehicles, OHV's, and snowmobiles) is a popular recreational activity on the Forest, followed by camping, hiking, biking, mountain climbing, fishing, hunting, skiing, snowshoeing, boating, and horseback riding. Recreation use on the Forest within the project area is high. Use is year round with OHV, and automobiles prevalent in the summer and extensive snowmobile use in the winter. Two major campground facilities are within the project area, Halfmoon Creek and Turquoise Lake campgrounds. Ski Cooper, a small ski area accessing approximately 400 acres of skiable terrain, is also within the project area. Recreationists also access several 10<sup>th</sup> Mountain Division Huts year round via ski, snowmobile, or hiking; three of which are near the project area. Permitted recreational races are very popular on the district and within the project area, including large events such as the Leadville Trail 100 series as well as other bike, foot and ski races. A portion of the Continental Divide National Scenic Trail (CDNST), sections of the Colorado trail and popular trailheads accessing 14,000 ft. peaks (such as Mt. Massive and Mt. Elbert) are also located within the project area. Motorized and non-motorized recreational use (including OHV use, snowmobile, camping, horseback riding, mountain biking, hiking, hunting, and fishing) has led to the development of non-system roads and trails, development of dispersed campsites, erosion, disturbance to wildlife species, and the vectoring of invasive and noxious weeds in previously pristine areas. Roads in particular increase soil erosion, increase sedimentation, fragment, and directly remove, habitat, and facilitate the spread of invasive and noxious weeds. The spread of noxious weeds has led to changes in species composition of the Forest and increased competition with native plant species which have adversely affected many plant and wildlife species. Each of the above activities have incrementally impacted wildlife species addressed in this assessment directly, indirectly, and cumulatively through fragmentation, habitat loss, and loss of effectiveness through human disturbance.
- *Human development* – Subdivision and development of private lands within the analysis area adjacent to federal lands is expected to continue to increase. The land surrounding federal lands is sparsely populated with large tracts of land per person. There are private in-holdings with structures located near the project area. This will continue to impact and fragment species habitat, fragment and isolate populations, increase the risk of weed invasion, and increase the incidence of wildfire. Human population growth has remained fairly flat over the past decade in Lake County, and a relatively small population growth is predicted over the next decade.
- *Climate change* – It has been well documented in numerous studies that the world is warming. U.S. average temperatures have increased more than 2°F in the last 50 years, and are projected to increase further (USGCRP 2009). Numerous studies have shown shifts in density, which can be created by a change in abundance within the range of species, and/or a shift in range boundaries. Ultimately, the greatest impact on plants and wildlife may not be from the

climate change itself, but rather from the rate of change. Given enough time, many species would likely be able to adapt to shifts in the climate, as they have done in the past. However, the current projected rate of warming is thought to be greater now than has occurred at any time in the last 10,000 years (Intergovernmental Panel on Climate Change (IPCC) 2007). Resource managers must consider climate impacts in the context of multiple natural and human-induced changes that are already substantially affecting species, habitats, and ecosystem functions and services, including habitat loss, fragmentation and degradation, invasive species, over-use, and disease.

## 9.0 EFFECTS TO EVALUATED SPECIES AND DETERMINATIONS

See Wrigley et al (2012) for species account information applicable to species being addressed under this Biological Evaluation.

### 9.1 Cumulative Effects (Applicable to all Wildlife Species Addressed)

An activity is considered to contribute to cumulative effects until its effects are no longer detectable (i.e., the area has returned to a state similar to that which existed before implementation of the proposed project, assuming all else remains the same). Thus, the time frames that an activity contributes to cumulative effects varies by project type (i.e., a clearcut of old-growth spruce-fir forest would contribute until the clearcut returned to an old-growth forest [~300+ years], while burning a grassland full of annual grasses would contribute cumulative effects until the grassland had returned to the previous structural stage [~1 year]). Changing structural stages and canopy cover of forested areas, re-constructing vegetated road areas, developing temporary roads, removing snags and large woody material, prescribed burning, project related disturbance activities, installation of culverts and working in live water, etc. have the potential to impact the productivity and survival of FS sensitive and MIS species as described in the direct/indirect effects sections for the respective species, and therefore, when added to the past and present impacts, have the potential to become cumulative effects.

Because many cumulative effects are applicable to each species, the following is a general discussion of the effects from these activities and is pertinent to all species addressed. Additional cumulative effects are also discussed later for a particular species as well, if there are more detailed effects for that species. Cumulative effects include the environmental baseline plus the additive effect of reasonably foreseeable future state, private, tribal and federal activities. Also see additional cumulative effects in *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forests* (Wrigley 2012) which can be found on file at the District which is incorporated by reference here as well.

Below is a summary of future federal and non-federal (private, state, or tribal) activities that are reasonably likely to occur within the action area that directly and indirectly affect species addressed in this assessment. These are added to the environmental baseline (discussed above in Section 8.0). In many instances, those past activities and their effects remain to this day and are currently ongoing as well.

- Mining (on non-federal/federal lands) can cause destruction of habitat, leaching of heavy metals in to streams changing stream pH, erosion, and sedimentation

into streams. Some smaller (less than 5 acres) active mining claims are within the analysis area. For the most part, future mining activities are expected to be much less common and at a smaller-scale than has occurred historically. These activities have and will continue to affect wildlife species addressed here indirectly and cumulatively through fragmentation, habitat loss, degradation of habitat, and loss of effectiveness through human disturbance.

- Fire suppression (on non-federal/federal lands) has led to increased fuel loading, tree density, and canopy closure in some areas – particularly lower elevations where the fire-return interval is shorter than the longer intervals in high elevation forested ecosystems. For example, fire suppression has prevented natural thinning of the predominantly lodgepole pine stands and limited tree growth in many areas. These small, dense stands are now relatively homogenous and are more susceptible to high levels of insect and disease populations and tree mortality (which ultimately results in more open areas as trees die). Few snags were created because of fire suppression and existing snags continued to be harvested for fuel. These historic activities combined to produce a forest that has smaller trees, less structure (snags and CWD), less species diversity, and a low stand age diversity (more mid-seral forests) that have directly and indirectly affected many of the wildlife species addressed here. Future suppression activities are expected resulting in a continuation of these effects. However, an increased amount of prescribed fire and use of natural fires is also expected in the future which would lessen the impacts stated above, benefiting many of the species that have evolved with fire as a major disturbance.
- On-going and future motorized and non-motorized recreational use (including OHV use, camping, horseback riding, mountain biking, hiking, hunting, and fishing) will continue to lead to the development of non-system roads and trails, development of dispersed campsites, erosion, disturbance to wildlife species, and the vectoring of invasive and noxious weeds and predators in previously pristine areas. Numerous activities require continued use of, and/or construction of new roads and trails on both federal and non-federal lands. New roads in particular (as discussed above and in Wrigley et al. 2012) increase soil erosion, sedimentation, fragmentation, directly remove habitat, and facilitate the spread of invasive and noxious weeds and predators (e.g., corvids). The spread of noxious weeds will continue to lead to changes in species composition of the Forest, increased competition with native plant species, and altered fire regimes that will adversely affect many plant and wildlife species addressed here. Each of these activities is expected to continue and increase in the future and will adversely impact wildlife species directly, indirectly, and cumulatively through fragmentation, habitat loss, degradation, and loss of effectiveness.
- The Forest and adjacent ownerships are an important resource providing for a wide variety of public recreational activities, which are expected to continue to increase in the future as the population of the region continues to grow (LRMP). A substantial amount of public recreation currently occurs over the entire analysis area. Use by the general public in some areas of the District is substantial. An average of approximately 77-90% of the overall recreation use on

the District is from public recreation in some important mountainous areas. The attractions of climbing “14er peaks” and high elevation lakes draw people to these scenic mountains. As populations in Colorado and the Front Range continue to grow, there will be increasing use of the backcountry for recreational activities, which will increasingly harass wildlife species and destroy their habitats. In areas of concentrated public recreation, effects from future public recreation will contribute to cumulative effects to each of the species addressed.

Other motorized use by the public, such as snowmobile use is unrestricted over the entire District (outside of Wilderness Areas). Snowmobile riders are only limited by their machines, terrain, and snow conditions. Public use during the winter is widespread over the District (depending on snow condition) and their use is currently not regulated by the Forest Service or restricted to designated snow compaction routes. This increases in orders of magnitude the impacts from snow compaction, noise disturbance, and numerous other impacts to habitat and species from these and other similar recreation activities. For example, general public recreation uses in several important high winter concentration areas is noteworthy- particularly in winter. General public use accounts from about one-half to 90% of the winter recreation within these areas. Given the existing and anticipated annual increase use in public use, these recreation activities occurring on the Forest may impact these species addressed even further. Impacts from these activities to wildlife are increased considerably from this additive use.

Non-motorized activities by the general public occur frequently in roadless, remote backcountry locations (e.g., horseback, hiking, snowshoeing, skiing). In areas where general recreation use is low (e.g., backcountry), effects from public recreational activities may be of greater influence on these species due to habitat modification (e.g., snow compaction and ground disturbance), changes in wildlife species composition (increased predators), and noise disturbance to wildlife in remote areas. Outside of wilderness areas, motorized winter and summer use will also occur. As discussed above, recreation activities have influenced the travel system in the analysis area and this is expected to increase into the future. Motorized OHV use is restricted to designated routes; however, compliance is not often achieved. Increased use of OHVs for recreational use has resulted in an extensive “user-created” network of travel routes. As these new routes become more established over time, they will eventually be viewed by the public as system routes. The continued creation of new roads/trails will decrease the habitat effectiveness and capability within the analysis area. Roaded areas will also receive heavier recreational use because of easier access.

Many of these types of recreation use can lead to habituation or harassment of animals, depending on the factors listed above in the previous section. Effects of recreation activities on these species vary and depend on the type of activity as well as the species affected. Not only does recreation have direct effects to these species, but also indirect effects on animal populations are likely to be substantial but there is little rigorous documentation on these impacts (Cole 1995).

*“Recreational activities clearly have substantial and generally adverse influences on terrestrial vegetation and soil, and on aquatic systems. Since these provide living space, shelter, and food for wildlife, animals are affected by these changes. For vertebrates,*

*amphibians, reptiles, small birds, small mammals, and many fish, these indirect effects are likely to be more substantial than direct impacts from recreationists” (Cole 1995).* Each of the above activities will continue to increase in the future both on and off-Forest, incrementally causing substantial impacts to wildlife species addressed in this assessment directly, indirectly, and cumulatively through fragmentation, habitat loss, degradation, and loss of effectiveness through human disturbance. These activities are expected to increase and have even greater impacts in the future.

- The impact of invasive plants (weeds) and animals (which can displace native/desirable wildlife species – e.g., cowbirds) on biodiversity is a major concern on all land ownerships in North America. Although the magnitude of the effects of non-native invasive plant and animal infestations specifically on these species’ habitat has not been fully understood, the potential exists for large-scale impacts and alteration of habitat. Invasive weeds such as diffuse and spotted knapweed (*Centaurea diffusa* and *C. maculosa*), leafy spurge (*Euphorbia esula*), rush skeletonweed (*Chondrilla juncea*), dalmation toadflax (*Linaria dalmatica*), and Canada thistle (*Cirsium arvense*), cheatgrass (*Bromus tectorum*), and many others have the potential to alter habitats important to these species at both the local and ecosystem scale (Ruediger 2000). Many of these plants are more easily eradicated at the level of a few plants or a few acres. Once established, they spread aggressively and become extremely difficult to control. Invasive species impact natural habitats, alter ecosystem processes such as nutrient cycles and fire regimes, and reduce biodiversity. Invasive species have and will continue to cause devastating effects directly on many wildlife species and their habitats. Actions could include efforts to prevent the establishment of new weed populations, controlling the spread of existing infestations, providing information to the public, and cooperating with other agencies and landowners in developing and implementing prevention and control programs. The Rocky Mountain Region Invasive Species Management Strategy (U.S. Forest Service 2008) addresses the management, control, and treatment of weeds in order to minimize effects, although these plants and their effects will not be eliminated.
- Future non-federal and federal water development projects such as municipal water sources for surrounding towns and cities – particularly to satisfy the growing demand of the Front Range Region are anticipated to impact these wildlife species and their habitats directly, indirectly, and cumulatively in the future through water depletion, fragmentation, and habitat loss. Additional ditching and draining will negatively impact wetlands throughout the western United States. Ditching and draining has been implemented for a variety of reasons, including creation or improvement of livestock pasture, conversion of wetlands or wet meadows for agriculture (particularly hay production), water diversion, mining, and peat mining. Ditching or draining alters water relations within the wetland, leading to numerous secondary effects such as species composition change, easier access to livestock, wildlife, and motorized vehicles, colonization by invasive plant species, and others. These activities are expected to increase in the future.



- Future timber harvest and thinning on both federal and non-federal lands will lead to a more open forest canopy with additional light reaching the forest floor affecting microhabitats, moisture, etc. (which may be beneficial or detrimental depending on the species), soil disturbance and compaction, development of skid roads, noxious weed invasion, and other effects. Changes in forest composition, structure and fire frequency have also taken place and will continue to do so with future projects. This may particularly be detrimental to species requiring denser forests with higher canopy cover, older-aged forests, high amounts of snags, logs/CWD, etc. although they may benefit those species preferring more open and younger-aged forests, shrublands, etc. These actions have and will continue to incrementally impact many wildlife species addressed here in the future directly, indirectly, and cumulatively through fragmentation, habitat loss, degradation, and loss of effectiveness through human disturbance. Future federal reasonably foreseeable actions include a large scale vegetation treatment project currently in the beginning stages initiated by the Bureau of Land Management (BLM), *Vegetation Manipulation Management: Chaffee and Lake County Planning*. This project would be a joint effort between the BLM and the USFS in which up to two miles of forest service land adjacent to BLM parcels could be treated. The proposal includes all BLM lands in Chaffee and Lake County as well as the adjacent federal forest lands. These activities have and will negatively affect to varying degrees these species and their habitats directly, indirectly, and cumulatively as discussed previously.
- Human development is expected to continue in the analysis area on private lands as well. The population in Lake County and surrounding counties within the analysis area is expected to continue to increase approximately 2-5% annually over the next 30 years (Colorado Department of Local Affairs (CDLA) 2013) which will further impact wildlife species and habitats. As more and more private lands adjacent to the Forest are developed, this could adversely affect many plant and wildlife species by the following: direct habitat loss, increased fragmentation, further isolate populations, increased frequency and intensity of human disturbance, increased recreational use from nearby residents, and increased risk of weed invasion. In addition, housing units and human developments within wildland/urban interface areas immediately adjacent to the Forest substantially increase the risk of wildfires on the Forest that also will affect habitat for these species. This will cause direct and indirect adverse effects to wildlife and their habitats through direct and indirect habitat loss and degradation.
- While climate fluctuates naturally, it is widely accepted that weather patterns (temperature and precipitation) in the western United States is changing substantially and these changes will continue to affect wildlife distributions and habitats. For example, riparian areas have been, and will increasingly be impacted as a result of decreased water availability leading to lowered peak flows and a decrease in the area, intensity, and duration of wetted soils. Shifts and changes in wildlife habitats are expected to substantially affect wildlife and their habitats as a result of changes in temperature and precipitation. Vegetation dynamics, disturbance, and climate and their interactions are key elements in predicting the future condition of ecosystems and landscapes and the

vulnerability of species and populations to climatic change. Climatic factors such as temperature, precipitation, and wind patterns are among the many factors that influence vegetative structure and composition, fire behavior and wildlife habitat. Changes in general climate trends in North America during the past 100 years include (Inkley 2004);

- **Temperature**
  - Global surface temperatures increases
  - Increase in night-time low temperatures
  - Greater warming on land than on water
  - Greater warming at higher temperatures
  - Fewer days of extreme low temperatures
  - More days of extreme high temperatures
  - Greater warming in winter than in summer
- **Precipitation**
  - Increased frequency of precipitation events
  - Increased intensity of extreme precipitation events
  - More areas with increased precipitation than decreased
- **Other climate factors**
  - Increased cloud cover
  - Sea level rise
  - Reduced snow cover
  - Receding glaciers
  - Thinner and less areal coverage of Arctic sea ice.

Other indirect effects of climate change may have beneficial or detrimental effects on many of the species addressed here. A recent study of the effect of climatic change on wildfire in the western U.S. (McKenzie 2004) determined that with warming climate, fire seasons will likely be extended and that total area burned is likely to increase. As a result, important changes in the distribution and abundance of dominant plant species in some ecosystems may occur. Some species that are sensitive to fire may decline, whereas the distribution and abundance of species favored by fire may be enhanced. For example, stand replacing fires are a common occurrence throughout much of lynx habitat and often provide conditions conducive to producing good quality snowshoe hare habitat.

The complexities of climate change described above are likely to affect wildlife and ecosystems in equally complex ways, and vary tremendously. For example, increased nighttime temperatures could markedly influence the range patterns of species with life histories especially influenced by ice or snow cover, or other species that require certain minimum temperatures to induce physiological changes (seed germination for example). These same species could be largely unaffected by increased daytime temperatures however.

In response to projected climate changes in the next 100 years, the geographic ranges of North American flora and fauna (plants and animals) are expected to shift upwards in elevation and generally northward (IPCC 2002). Temperature, rainfall, soil moisture, and specific physiological requirements of each species addressed here are expected to be driving forces in these shifts. Range shifts of wildlife are likely to depend upon factors such as the availability of migration corridors, suitable habitats, and the

concurrent movement of forage and prey species. Further complicating potential range shifts will be other landscape changes such as roads, cities and habitat fragmentation, all of which can present significant barriers to species range shifts (Inkley 2004). These changes will have profound effects on wildlife, their habitats, and entire ecosystems.

In summary, there is incomplete or unavailable information upon which to base any more detailed analysis of climate change risk factors for many of the wildlife species addressed here. The best available information indicates that climate change poses potential substantial risks, but the exact nature of these risks remains uncertain at this time.

Cumulative effects include direct and indirect mortality, fragmentation of habitats, and habitat degradation from future public recreation activities (e.g., camping, hiking, biking, hunting, horse riding, snowmobiles, OHV/vehicles, boating, race events etc.), vegetation treatments, mining, etc. and the increased threat of spreading noxious/invasive weeds from these and other activities. Other cumulative effects of ongoing and future federal, state, private, and other activities include fire suppression, presence of roads, road construction and maintenance, motorized and non-motorized recreation, vehicle traffic, and human development. The ongoing Northwest Fuels project and the proposed BLM vegetation management project also contribute to the cumulative effects. Some of these areas are also experiencing MPB activity and are scattered across the District. Important impacts from these activities, adverse potential impacts from climate change, and other factors all may act synergistically with other environmental stressors that directly, indirectly, and cumulatively affect them in the short-term (10 years or less), long-term (more than 10 years), as well as permanently. Impacts to these species from each of these activities and those discussed in the Environmental Baseline (section 8.0) would continue to occur. The proposed action would add to these effects.

## **9.2 Forest Service Sensitive Species**

### **9.2.1 Riparian Habitat Species – Boreal Toad (*Anaxyrus boreas boreas*), Northern Leopard Frog (*Lithobates pipiens*), and River Otter (*Lontra canadensis*)**

The sensitive species analyzed in this section are grouped together because they are all regularly dependent on riparian habitats (stream banks, shorelines, ponds, lakes or wetlands) and actions that affect these habitats may impact these species. For more information on these species life history see *Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forests* (Wrigley 2012).

Boreal toads and northern leopard frogs inhabit slow moving or stagnant waters often found in or near historic or active beaver ponds, lakes or ponds with emergent vegetation as well as upland areas. The primary threat to toads and frogs is believed to be habitat alteration and degradation, water quality, diseases, and introduction of predators to breeding areas (Smith 2007). Again, there are breeding toads on the district though none were found during extensive amphibian surveys (2011, 2012 and 2013) in suitable habitat within the project area. There have been no records of northern leopard frogs on the Leadville RD, but there have been on the Eagle-Holy Cross RD and there is suitable habitat inside the project area.

River otters are typically associated with streams, lakes and reservoirs with high water quality and good food sources (fish or crustaceans). The other important habitat attribute is riparian vegetation, which provides security cover when they are feeding, denning, or moving on land (Boyle 2006). There has been one recent confirmed sighting in 2011 on the Leadville RD but not within the project area and another unconfirmed sighting in 2013 within the project area.

#### **No Action Alternative Effects**

Riparian areas would remain functioning as they are today. There would be no vegetation or fuels management under this alternative, thus no impacts would occur from vegetation manipulation. Recreation use would continue to impact riparian habitats. Some areas have been degraded by recreational use (trampling, soil compaction, road and trail crossings) and would continue to effect riparian species and their habitats. Continued recreation (camping) within and near riparian habitats further degrades habitat conditions and water quality. Recreation in these areas also raise the potential of contact with humans and frog or toad populations, increasing the threat of the spread/introduction of *Batrachochytrium dendrobatidis* (Bd) and other diseases, as well as the capture of individuals. Because of the ongoing degradation of riparian habitats from recreational activities discussed above and effects addressed in the cumulative effects section (9.1) the no action alternative **“may adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend toward federal listing”** of the boreal toad, northern leopard frog, and river otter.

#### **Alternative 1 (Proposed Action) Effects**

Though amphibians and river otter are closely associated with riparian areas, they also do rely upon upland forested areas for portions of their life cycles (overwintering for toads, traveling for otters). The vegetation treatments proposed in this Alternative include thinning and clear cutting stands mostly in lodgepole pine while leaving reserves for wildlife refuge. In general, no treatments would be allowed in the water influence zone (WIZ) and these riparian areas, including kettle holes, would be buffered 100 feet on each side of the WIZ (design criteria 15 above). There is approximately 1,220 acres of mapped riparian habitat within the project area. As the riparian areas themselves would be buffered from treatment, adjacent forested areas sometimes used by these species could be impacted. Fuels reduction (thinning and prescribed burning) treatments, if they are not too widespread or intensive may improve suitability of potential breeding areas by increasing prey habitat for toads and NLFs in the adjacent forest stands by stimulating early seral conditions (Pilliod, et al. 2006). If partial harvest treatments are done to lighter intensities, they can produce a combination of positive and weaker negative responses than intensive or clearcut treatments (Semlitsch 2009). Their study disclosed that clearcuts and intensive canopy removal had detrimental effects of canopy removal, higher surface temperatures, and loss of soil-litter moisture in terrestrial habitats surrounding breeding ponds and mitigating these effects is critical to maintaining viable amphibian populations in managed forested landscapes. According to Smith and Keinath (2007), most amphibians do not use habitat in recently clearcut areas or severely thinned areas, and there is a general association of stand age and abundance of them, with toads and frogs more common in older stands. Project activities such as thinning, patch cutting, salvaging, yarding/skidding, and prescribed burning can all impact sub-adult and adult toad and frog upland travel and foraging

areas due to habitat conversion and fragmentation (i.e., loss of vegetative ground cover, litter, and large woody material that are used as microclimatic habitat sites). Consequently, this could have some negative impacts on amphibian population parameters such as productivity and survival. Areas thinned in the Tennessee Creek project area would be done in an un-even age management style with reserves (areas of no treatment) interspersed throughout the project area. According to the *Boreal toad Conservation Plan and Agreement* (2001), uneven-age stand management is the preferred method of tree removal in boreal toad habitat. This practice results in less disturbance to the understory and ground. Again, there are no known boreal toad or northern leopard frog breeding sites within the project area, though suitable habitat is present. Should a breeding site be discovered during the course of this project and implementation, these sites would be buffered by no treatment boundaries 300 ft. surrounding the site (design criteria 16 above).

River otters are highly mobile and readily disperse along waterways and they are able to move between drainages by crossing high ridges or even mountain passes (Melquist 1983). Melquist also reports that river otters generally avoid areas where cover is lacking, such as reservoir shorelines with little vegetation or structural cover, even if food is abundant. Timber harvest can reduce riparian cover, increase stream siltation, and reduce woody debris that provides important cover.

In general, no treatments would be allowed in the water influence zone (WIZ) and these riparian areas, including kettle holes, would be buffered 100 feet on each side of the WIZ (design criteria 15 above). Exceptions to this would be the stream restoration proposal for Halfmoon Creek where natural river restoration techniques would be utilized to improve sediment transport and aquatic habitat. Fish friendly culverts or aquatic organism passageways (AOPs) would be installed to return native flow back to creeks and promote movement of aquatic species as well. The installation of nesting platforms would likely be very near the shoreline at Turquoise Lake. To protect and improve riparian ecosystems, non-system routes and dispersed campsites that are near or go through riparian areas may be closed. Treatments include ripping, seeding, bouldering, fencing or other methods that would restrict access. Heavy equipment may be used. To improve erosion and compaction issues at designated camp sites (campgrounds), identified areas would be ripped (breaking up compaction), contoured, mulched, seeded, and/or have erosion control netting installed as needed. Both hand and mechanical treatments may be utilized.

There could be some short-term (0-10 years) negative effects during the implementation of these riparian restoration proposals mentioned here including increased sedimentation during implementation and human and noise disturbance. Highly mobile river otters could disperse upstream or downstream of the disturbance, whereas frogs and toads may or may not depending on their life cycle (eggs, tadpoles, adults) at the time of disturbance. The amount of sedimentation created would be dependent upon the stream size, flow, soil disturbance, weather patterns, etc. Should a boreal toad breeding site be discovered during the course of this project and implementation, these sites would be buffered by no treatment boundaries 300 ft. surrounding the site (design criteria 16 above). Before heavy equipment and vehicles would be allowed to cross streams, an aquatic biologist and/or hydrologist will be consulted to determine where crossings would occur or be constructed, and to specify any stipulations necessary to

minimize negative impacts on aquatic resources (design criteria 17 above). All activities proposed to take place within the WIZ are designed to restore low functioning habitats to benefit the addressed species here as well as other fish and aquatic species in the long-term (10+ years). Given the low probability of boreal toads, northern leopard frogs, or river otter in the project area and the small likelihood of direct impacts to them from the proposed activities, there is not a concern that the proposed action would result in a trend in federal listing or a loss of its viability rangewide. Regardless, management activities in suitable/potential amphibian and otter habitat should maintain suitable habitat conditions for them to re-colonize historical areas that may be unoccupied at the present time. Based on the rational here and in the above cumulative effects section (9.1), Alternative 1 (Proposed Action) **“may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing”** of the boreal toad, northern leopard frog, or river otter.

### **Alternative 2 Effects**

Because Alternative 2 is identical to Alternative 1 for the actions that will influence riparian areas, the effects would be the same for these activities (Halfmoon Creek project, East Tennessee Creek, restoration of dispersed campsites etc.). Again, the differences between the two alternatives are in the percentages of tree harvest designated as clear cuts versus thinnings. This alternative would likely have a higher degree of negative effects due to the impacts of more clear cutting (3,970 acres compared to 2,485 acres in Alternative 1). This would cause more canopy removal, higher surface temperatures, and loss of soil-litter moisture in terrestrial habitats surrounding breeding ponds. The effects of Alternative 2 timber harvest would be more exaggerated. Based on the rational here and in the above cumulative effects section (9.1), Alternative 2 **“may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing”** of the boreal toad, northern leopard frog, or river otter.

### **9.2.2 Sagebrush Species- Brewer’s Sparrow (*Spizella breweri*)**

Brewer’s sparrows are present within the project area where sagebrush communities are found. Sagebrush habitats within the project area, as well as the District, are typically small in size and occur as a mosaic within forested and other mountain grass and shrubland habitats.

### **No Action Alternative Effects**

The No Action Alternative would allow current forest and vegetative trends to continue. Currently many conifers and aspen are encroaching into remnant sagebrush and grasslands as successional processes gradually convert them into forests. These processes would continue overtime, decreasing the amount and quality of these important habitats in the long-term. However, sufficient refuge and unaffected habitats exist in the Analysis Area and elsewhere. The amount of sagebrush in the project area is very minimal (20 acres) and the continued encroachment overtime would not have a noticeable effect in the project area. Therefore, the viability and distribution of the Brewer’s sparrow within the Planning Area (Forest) would not be substantially affected. Because of the reasons stated here in addition to the cumulative effects discussed in the section 9.1 above (recreation impacts to habitat, noxious weed invasion, OHV use, etc.), the No Action Alternative would have **“no impact”** on the Brewer’s sparrow.



### Alternative 1 (Proposed Action) Effects

Brewer's sparrows are sagebrush obligates and only a minute amount (about 20 acres) of the project area is classified as sagebrush. They prefer areas dominated by shrubs compared to those dominated by grass (Holmes 2005). They also select undisturbed sagebrush that has not been degraded by livestock grazing or wildfire. Habitat loss and fragmentation seem to be the biggest threat to Brewer's sparrow as large areas of sagebrush are essential for breeding (Holmes 2005). Human development adjacent to public lands often takes place in these lower elevations where sagebrush may be fragmented and destroyed. The proposed project targets removal of encroaching conifers with limited additional access needed within this species' habitat. This would maintain/enhance the small amount of sagebrush habitat in the project area, thus benefitting this species in the long-term by maintaining sagebrush communities into the future (Photo 1). The proposed action also states that no prescribed fire would take place in sagebrush communities in order to preserve these fire intolerant habitats. There would be some short-term impacts from noise disturbances during operations that would cause minimal short-term disruption in their activities and displacement may occur within and adjacent to treatment areas.

**Photo 1.** Conifer encroachment into sagebrush. Conifers in the foreground would be removed to improve sage-dependent species habitat.



Other activities associated with the proposed action will not take place in sagebrush communities and therefore would have no impact on Brewer's sparrow or their habitats. Because of the reasons stated here in addition to the cumulative effects discussed in the section 9.1 above (recreation impacts to habitat, noxious weed invasion, OHV use, etc.), Alternative 1 (Proposed Action) **"may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing"** for the Brewer's sparrow.

## Alternative 2 Effects

The proposed activities for Alternative 2 differs from Alternative 1 only in percentages and acres of lodgepole pine and aspen treated. The proposed treatments within sagebrush communities (cutting out encroaching conifers) remains the same and therefore would have the same impacts as discussed above for Alternative One. All other proposed activities (restoration of dispersed campsites, stream rehabilitations etc.) also would remain the same and would not take place in Brewer's sparrow habitat. Therefore, the impacts would be the same and Alternative 2 **"may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing"** for the Brewer's sparrow.

### 9.2.3 Aspen and Douglas fir habitats – Flammulated Owl (*Otus flammeolus*)

Flammulated owls are typically found in older stands of dry coniferous forests, especially ponderosa pine. Douglas fir and aspen stands also can provide suitable habitat for these small owls. There is a minute amount of Douglas fir (24 acres) inside the project area and approximately 455 acres of aspen that could provide some flammulated owl habitat. The aspen and aspen/conifer areas provide for the best flammulated owl habitat in the project area. There are no documented occurrences on the district but there have been only limited surveys for flammulated owls on the district and none specifically for the Tennessee Creek Project area. The flammulated owl depends on cavities for nesting, open forests for catching insects, and brush or dense foliage for roosting (Kingery 1998). Because this species shows a close association with older forests, declines in the extent of mature and older forests due to timber harvest and fires may have led to declines in the species (Wrigley 2012).

### No Action Alternative Effects

Under this alternative, larger trees would continue to develop and these forests would develop into older-ages and late-successional forests with multi-layered canopies and a high degree of structural diversity. Habitat complexity would also continue to increase as these forests age into later seral and old-growth forests. Under this alternative, there would be no additional or new disturbances from increased human activity associated with any vegetation treatments, prescribed fire etc. Because suitable habitats would continue to develop into old growth stands and there would be no direct affects from human activities, the No Action Alternative would have **"no impact"** on flammulated owl.

### Alternative 1 (Proposed Action)

The proposed action could have negative impacts to flammulated owl from human disturbance during implementation, loss of habitat due to vegetation removal, and changes in nesting and foraging habitat qualities. However, one of the objectives of the proposed action is to create more species diversity. Douglas fir would not be targeted for harvest, and in fact, would be retained and encouraged to grow by cutting out competing lodgepole pines. Only approximately 120 acres of aspen are proposed for treatments out of the 455 acres available within the project area. Aspen treatments are designed to promote aspen growth by removing encroaching conifer species and cutting the outer edges of stands to promote sucker growth and aspen regeneration. Habitat quantity and quality for flammulated owls is low-moderate within the project area. Treatments would retain and encourage regeneration of aspen which provide nesting opportunities for the owl. The proposed activities could cause disturbances due to the

presence of personnel, machinery, smoke, noise, etc. The biggest impacts to these species would be the removal of snags, CWD, and canopy cover. The proposed treatments would reduce the density of conifer stands. A more open stand structure could be beneficial for flammulated owl foraging as long as remaining habitat requirements are still met. Some opening up of the forest in places would likely cause an increase in shrub/dense foliage development, which could provide better foraging (increased insect densities) and roosting (brush and dense foliage) opportunities. The proposed action would assist in creating a mosaic of habitat types and structures within the project area. Flammulated owls are secondary cavity nesters and rely on snags for perching, singing, and/or nesting in. Design criteria number 2 above ensures that a minimum average of 8 snags per acre is retained in every treatment unit. Suppressing naturally frequent ground fires in forests has allowed some stands to become dense thickets that could physically limit foraging movements of flammulated owls. The thickets also reduce the abundance of available arthropods by preventing the development of grassy and herbaceous understories. Patch cuts in and near aspen stands would open up the understory increasing grass and forb growth, thereby increasing foraging opportunities for flammulated owls. Wildfires are expected to increase in both number and intensity with large stand replacing fires becoming more likely than in the past due to increased fuel accumulations and the increased prevalence of stand structural homogeneity in forests on a landscape scale with fewer natural openings or firebreaks present. Prescribed burns proposed here would also have the same effect as patch cuts of temporarily opening up the forest floor and increasing grass production. Small fires are beneficial to all species analyzed as a whole in that they increase the diversity of the area and optimal habitat for each species is renewed. Individual animals may be negatively impacted if their home range is burned, but surrounding habitats will provide for local population sustainability. The short term (0-30 yrs.) benefits to flammulated owls would include increasing foraging habitats by opening up some portions of aspen stands. The long term (30+ yrs.) effects of patch cutting, thinning and clear cutting would include increasing horizontal diversity which could make foraging more difficult. The other proposed activities (Halfmoon and East Tennessee Creek stream restoration, nesting platforms, campsite rehabilitation), would not take place in flammulated owl habitat. Therefore, these additional activities would not have any direct impacts to flammulated owl or their habitats. The continuation of recreation, OHV use, fire suppression, and human development mentioned above in the cumulative effects section would also impact flammulated owls or their habitat. Design criteria number 7 above ensures that if a nesting flammulated owl was found inside the project area, that seasonal restrictions and appropriate buffer zones would be implemented. Overall, the proposed activities would have both negative and beneficial impacts to flammulated owls. Based on the rationale above and the fact that there is adequate, higher quality (old growth ponderosa pine) habitat available elsewhere on the district and forest, Alternative 1 (Proposed Action) **“may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing”** of the flammulated owl.

## Alternative 2

This alternative is very similar to Alternative 1 other than there are fewer total acres being treated (7,000 compared to 9,595) but a larger percentage of those are in clear cuts (3,970 versus 2,485). The amount of aspen treated in Alternative 2 is slightly more (180 acres compared to 115 acres) than that proposed in Alternative 1. The additional 65

acres of aspen treatment is likely to have insignificant effects overall to flammulated owl. All other actions would have the same effects as in Alternative 1. The effects of Alternative 2 would be nearly identical to those identified in the previous alternative. Based on this rationale, Alternative 2 **“may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing”** of the flammulated owl.

#### **9.2.4 Lodgepole Pine Habitat Species** – Northern Goshawk (*Accipiter gentilis*), Bald Eagle (*Haliaeetus leucocephalus*), Hoary Bat (*Lasiurus cinereus*), and Rocky Mountain Bighorn Sheep (*Ovis canadensis Canadensis*)

These four species are grouped together because on the Leadville Ranger District, the habitat they utilize most frequently is lodgepole pine or lodgepole is the only component of their habitat that could be affected by this project. For example, bighorn sheep are usually found in open, rocky, steep terrain but they can be found in lodgepole when accessing mineral sources or traveling even if lodgepole is not a main habitat requirement. Of the eleven known northern goshawk nests inside the project area, seven of them are located in lodgepole pine trees (the other four in aspen trees). However, aspen stands are important for goshawks as well and are usually found somewhat adjacent to the lodgepole pine nests. Bald eagles are highly associated with and build nests adjacent to lakes and reservoirs that provide quality foraging habitat. The habitat directly surrounding and along the shoreline of Turquoise Lake, where bald eagles would likely nest if in the project area, is dominated by lodgepole pine. There are no known bald eagle nests inside the Tennessee Creek project area. Hoary bats are generalists when it comes to habitat, utilizing any forested stands throughout their range. They will be analyzed here to ensure any effects will be captured under the vegetation type with the greatest amount of acres proposed for treatment. There are no known records of hoary bats on the district or inside the Tennessee Creek project area though they are assumed to be present in low numbers on the district. Key elements of suitable bighorn habitat include steep, broken terrain, which serves as escape cover, and vegetation types that provide high visibility and forage such as grasslands and alpine tundra. Most of their time is spent in high alpine areas that provide these elements, but they are analyzed here to capture any modifications to their home ranges as they have been observed inside the project area.

#### **No Action Alternative Effects**

The No Action Alternative would have no direct impacts on goshawks, bald eagles, hoary bats, bighorn sheep or their habitat. However, there could be some mid- to long-term (5-50+ years) indirect effects if large areas of the forest succumb to beetle mortality and substantial sized portions of the forest die off. Large beetle kill areas would open up the forest canopy and create numerous snags and future CWD. Newly created large open areas (previously densely canopied forests) as a result of beetle kill would reduce the potential goshawk nesting areas in the project area. Goshawk foraging habitat could experience some beneficial and some negative impacts from an increase in open areas depending upon the size, shape, juxtaposition, and proximity to other open areas. Generally, smaller openings would likely be more beneficial to goshawk habitat while larger openings of low canopy covered areas would be minimally useful to goshawks for foraging and of little to no value for nesting habitat. Nest trees for eagles and roosting trees for hoary bats could also become scarce should a beetle epidemic kill a large amount of trees. Much of the lodgepole stands are all of similar age and structure,

making them susceptible to insect and disease. However, catastrophic events like these are impossible to predict and may not take place at all. Because this alternative would have no direct impacts on these species and large scale epidemics are impossible to predict the No Action Alternative would have “**no impact**” on the northern goshawk, bald eagle and hoary bat.

In the absence of fire or habitat management, vegetation succession has been a major cause of habitat loss for bighorn sheep in Colorado (Wakelyn 1987). Forests likely would become denser and encroach on historically open spaces, degrading visibility and decreasing foraging habitat for bighorns. Because the continuation of fire suppression and lack of habitat management in bighorn habitat leads to the degradation of the quality and quantity of habitat, the No Action Alternative “**may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing**” for bighorn sheep.

### **Alternative 1 (Proposed Action)**

Proposed activities such as thinning, burning, timber harvesting, riparian rehabilitation, temporary road construction, and equipment operations, etc. would occur in goshawk, hoary bat, bighorn sheep and bald eagle habitat as part of the proposed project (both in lodgepole as well as aspen). Up to 9,450 acres of lodgepole and 455 acres of aspen could be treated. However, not all of these acres are suitable for the species discussed here. Goshawks, bald eagles, and hoary bats tend to use larger diameter trees in older forest stands. There are no modeled habitat maps available for any of these species, but the acres of impacted suitable habitat are certainly less than the acres identified for treatment. Conversely, bighorn sheep habitat has been modeled and mapped by Colorado Parks and Wildlife (Colorado Parks and Wildlife 2013), and there are approximately 500 acres of bighorn sheep habitat inside the project area in treatable areas, with approximately 230 acres of that being winter range. The above activities could cause disturbances due to the presence of personnel, machinery, smoke, noise, etc., causing these species to disperse to other areas. Human disturbance associated with forest management and other activities may affect goshawks and can cause nest failure, especially during incubation (Kennedy 2003). However, other research in Kennedy (2003) from the USFWS reported that “disturbance generally does not appear to be a significant factor effecting the long-term survival of any North American goshawk population.”

The following paragraph on effects to goshawks from timber management comes from Kennedy (2003). *Forest management can impact the structure, function and quality of nesting and foraging habitat by removing entire nest stands, and removing canopy and mature trees, snags, and downed woody material. Forest management practices, such as controlled fire and thinning, may improve habitat for goshawks by opening up dense understory vegetation, creating snags, downed logs, woody debris, and other conditions that may benefit goshawks and their prey. One study suggested that goshawks can tolerate some levels of timber harvesting within the nesting stand (if no harvest is conducted between February and August) as long as cover reduction does not exceed 30%.*

According to studies identified in Kennedy (2003), goshawks have been documented to forage away from forest cover in naturally open habitats if available. Many of the

treatment areas of the proposed project do not currently have dense understory vegetation. Complete removal of understory would likely reduce goshawk and eagle prey habitat for small- to mid-sized mammals and birds. Consequently, patchcut areas (0-5 acres) as well as clear cuts (up to 40 acres) would cause a reduction in habitat for prey species in the short-term (0-5 yrs) and could cause an increase in prey habitat in the mid-term (5-20 yrs) as small mammals and birds begin to utilize the re-growth of vegetation in these areas. However, if the openings fill in with dense regeneration, as is expected, goshawk foraging opportunities would become limited due to goshawks' inability to exploit prey animals in densely stocked regeneration stands since goshawks primarily pursue their prey by chasing them down aerially.

Treatments may reduce the quality of habitat (both nesting and foraging) in some areas over the short-term (0-10 years); however, the quality of goshawk habitat is expected to increase in the long term (10 + years) by increasing vegetative diversity (i.e., increase the structural stages and species composition present in the project area) and maintaining a mosaic of structural stages across the landscape (Reynolds and others 1992). Small prescribed fires are beneficial to all species analyzed as a whole in that they increase the diversity of the area and optimal habitat for each species is renewed. Individual animals may be negatively impacted if their home range is burned, but surrounding habitats will provide for local population sustainability.

Closing and rehabilitating dispersed campsites would have a beneficial impact to nesting northern goshawks. In particular, areas around the Turquoise Lake northern goshawk territory currently receive high volumes of dispersed recreation and camping near the nest sites. Removing old campfire rings, rehabilitating the soils and enforcing the "no camping" restriction in these areas would provide a more secluded area to nest without human disturbance. The addition of a nesting platform could have beneficial impacts to bald eagle should they find the area suitable for nesting.

Design criteria (numbers 6-10 above) are in place to protect nest trees, adjust timing of treatment to avoid nesting season and create protective buffer areas if goshawks and/or bald eagles are detected in the project area during future surveys or during project implementation. While the impacts to goshawk habitat from the proposed project may be detectable and noticeable for the short- to mid-term (0-15 yrs) and may cause some negative impacts to individual animals, it is not likely to cause measurable impacts to them at the planning level. There should be long-term beneficial impacts to goshawk habitat due to the promotion of age class and stand structural diversity.

It is unlikely that the larger trees along the lake shoreline that may be suitable for bald eagle nesting would be removed as a result of this proposed action. The south side of the lake is too steep to safely treat and eastern edge consists of campgrounds, boat ramps, day use areas etc., and is likely too heavily populated with recreationists to be a desirable place to nest for a bald eagle. It is unlikely that bald eagles would nest in this area as the lake is usually frozen into May or June, prohibiting any foraging for fish (the main species in their diet) during critical breeding and incubating periods.

Hoary bats are habitat generalists and are solitary bats, only congregating during migration. Clear cutting patches of forest would directly affect the hoary bat should it be utilizing any of those trees for roosting. This would cause an overall loss of habitat for



this species until these trees return to sizes large enough to be suitable again for roosting. Thinned areas would still provide suitable roosting habitats and primary prey species (moths) should not be impacted as riparian areas (where moths are likely to be found) would remain buffered. Hoary bats are extremely mobile and would easily disperse to adjacent forested stands during project implementation. If they are present inside the project area, they are likely in low numbers and could disperse to any other forested stand for its roosting needs.

Treatments in bighorn sheep habitat could increase the effectiveness of the habitat by opening up the landscape and increasing the visual field of bighorns. Openings would also create more foraging habitat in the short term. Most mapped bighorn range is near the tree line, or in already open cliffy areas. These places are not likely to see much treatment as spruce/fir (which is not targeted for treatment) is generally the habitat type near tree line and open cliffy areas may not need treatment. However, the winter range located in the northern portion of the project area, does contain lodgepole pine and could be opened up with clear cuts or thinning. This would benefit the sheep as they travel through these areas to the natural mineral lick (a private gravel pit) that is drawing them into the area by increasing their visual field, further protecting them from predators. Reintroducing fire through prescribed burns in this area would also provide this benefit. However, the main travel corridor to and from this natural mineral lick is outside of the project area so this project may or may not directly influence the usage of the area. Design criteria 12 above is in place to ensure the protection of wintering bighorn sheep by restricting activities during the winter seasons. Short term impacts due to project implementation could be beneficial to bighorn sheep. Long term impacts as the openings and thinned areas regenerated to more dense stands, may decrease the visual quality of those treated areas. This project would not increase the chances of bighorns coming into contact with domestic sheep (causing disease transmission), a main cause of decline in sheep populations.

This proposed action would add to the effects discussed in the above Cumulative Effects (section 9.1). Based on this rationale, Alternative 1 (Proposed Action) “**may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing**” of the northern goshawk, hoary bat, bald eagle, and bighorn sheep.

## **Alternative 2**

Alternative 2 would have similar effects/impacts to goshawks and bald eagles as Alternative 1, but at a larger scale due to the increased acreages being clear cut under this proposal. However, the overall acreage treated (2,595 acres less) and the disturbance associated with implementation over a smaller area would be less. A larger percentage of openings would likely have more of a negative impact on northern goshawk nesting habitats but could increase foraging opportunities as grass and forb production would increase, in turn, increasing prey species availability. The same design criteria (numbers 6-10) mentioned above would remain in place to protect any historic, current, or future northern goshawk or bald eagle nesting territory. The negative effects associated with habitat loss for hoary bats in clear cut areas would be to a greater degree for this alternative as more acres would be temporarily lost. Bighorn sheep would see a greater short term benefit from this alternative but could have more adverse effects long term as denser stands regenerate in these openings, inhibiting the

visual field of bighorns. This alternative action would add to the effects discussed in the above Cumulative Effects (section 9.1). Based on this rationale, Alternative 1 (Proposed Action) “**may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing**” of the northern goshawk, hoary bat, bald eagle and bighorn sheep.

#### **9.2.5 Spruce/Fir Species – American marten (*Martes americana*), Boreal owl (*Aegolius funereus*), Pygmy shrew (*Sorex hoyi*), Olive-sided flycatcher (*Contopus cooperi*)**

These species have been grouped together because of their affinity for spruce/fir forests and the similar affects the proposed actions may have on these species. “In the main Rocky Mountains, martens tend to select for stands dominated by moist-site species like Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*), and select against stands dominated by dry-site species with little physical structure near the ground, including most stands of ponderosa pine and dry stands of lodgepole pine (*Pinus contorta*)” (Buskirk 2002). There have been several observations of marten on the Leadville Ranger District as well as inside the project area. Boreal owls are found in mature spruce-fir or spruce-fir/lodgepole pine forest interspersed with meadows (Andrews 1992). Boreal owls have been documented on the district though not inside the project area. However, only limited surveys were conducted for boreal owl for this project and so it is assumed that they are present where suitable habitat exists. Pygmy shrews are found in “wet conifer forests” with all known locations found in montane or subalpine landscapes dominated by conifer forests and dense stream networks that interact with various bogs, marshes, and other wetlands (Beauvais 2006). There are no records of pygmy shrew in the project area, district or forest. However, no surveys have been conducted and there is suitable habitat present; therefore, presence is assumed. The olive-sided flycatcher is associated with mature spruce/fir forest particularly if there are large conifers, bogs, and meadows present, preferring areas with abundant snags (Wrigley 2012). There are records of olive-side flycatcher on the Leadville RD but none known in the project area; suitable habitat exists so presence is assumed.

#### **No Action Alternative Effects**

There would be no direct impacts to any of these species under the No Action Alternative. Spruce/fir forest would continue to age, possibly increasing the quality of habitat for many of these species. There could be some indirect impacts to them in the long-term if there should be large forest die offs due to beetle infestations and large scale fires that may follow the die offs. This could cause a loss of foraging and nesting/denning habitat for these species if large areas of forest cover should be lost due to beetle kill or fires that could likely follow the die offs. However, these types of events may or may not occur and are impossible to predict if and when they would occur. There would be “**no impacts**” to the American marten, boreal owl, pygmy shrew, or olive-side flycatcher for the No Action Alternative.

#### **Alternative 1 (Proposed Action) Effects**

In this alternative, there are no green tree treatments proposed in spruce/fir habitats outside of the Ski Cooper Area boundary. There are about 300 acres of spruce/fir inside the Ski Cooper boundary where green tree harvest would consist of group and individual tree selection and treatments would be designed to develop multi-aged, multi-storied stands. There are no modeled habitat maps available for these species but

we assume that some of these 300 acres would be suitable, while others may not be. Treatment would be minor as Ski Cooper would not want major vegetation treatments to alter the integrity or visual quality of the family oriented ski hill. The purpose of the treatment proposed here is to be able to create some age and species class diversity within the ski area and to prevent widespread mortality if spruce beetle should arrive at epidemic proportions in the future. Stands with >35% dense horizontal cover (DHC) would be retained for quality lynx habitat and would also provide refuge for the species addressed here. Snags may or may not be left on the landscape depending on the hazard level associated with each. Though Ski Cooper is a small ski area, the habitat quality and effectiveness has already somewhat been compromised, especially during the winter months, due to human disturbance, noise, fragmented habitat, snow compaction from skiers, snowmobiles and grooming operations, and displacement associated with maintaining a ski area. Summertime activities continue as well with maintenance and project completion of various levels done by the ski area employees themselves. The implementation of group and individual tree selection within the Ski Cooper boundary is not likely to have substantial impacts beyond what is already occurring there for the species addressed in this section.

Outside of the Ski Cooper boundary, where spruce/fir trees are present in mixed conifer stands, they would be retained and encouraged to grow by cutting out competing lodgepole pine. This could encourage regeneration of spruce/fir as well as add growth and vigor to existing mature trees and would have insignificant, if not beneficial, impacts to the species addressed here. It should be noted that all of these species could use lodgepole pine habitats as well and could be affected by project implementation on surrounding or adjacent lodgepole pine forests. In these areas, loss of habitat, habitat effectiveness, habitat fragmentation, and disturbance caused by project implementation could cause negative impacts to the species addressed under this section.

This proposed action also takes into account the possibility of a future (within the next 10 yrs.) spruce beetle outbreak. There is a concern that the spruce beetle epidemic currently running its course approximately 80-100 miles south of the Tennessee Creek project area, may make its way to this area. Should spruce beetle trigger a major die-off in spruce/fir, then up to 1,400 acres (out of 1,550 acres of spruce/fir mapped within the project area) of dead or infected green trees could be salvaged. The remaining 150 acres would be left on the landscape in patches greater than 5 acres namely for lynx denning habitat. Dead stands that would be salvaged could provide important habitat components for any of these species (i.e. Subnivean travel corridors for marten, singing perches for avian species). Leaving large snag patches would provide habitat for the olive-sided flycatcher as well. It should be noted that the 1,400 acres of spruce/fir that would be treated should a spruce beetle epidemic arise, could actually be any combination of clear-cuts and thinnings, but it is not predictable at this time. In the "worst-case scenario", 1,400 acres would be the maximum amount salvaged (if all spruce/fir within the project area was killed including all spruce/fir inside the Ski Cooper boundary) but likely this amount would be less. Even during salvage harvest operations, minimum snag requirements (design criteria 2 above) would remain in place. Most likely there will be additional snags created due to beetle die off that will be retained post project implementation that will provide additional nesting/perching habitat for boreal owls and olive-side flycatcher. The maximum acreage of spruce/fir habitat that could be treated is 1,400 acres as a salvage harvest, though realistically, this

number would likely be less due to access, slope, or other unforeseen reasons. Again, these 1,400 acres of spruce/fir would **only** be salvaged **if** the spruce beetle killed off stands at an epidemic level, not if the stands remain within their historic range of variability as they are currently. If endemic (natural) levels of spruce beetle continue, no treatments will take place outside of the 300 acres inside the Ski Cooper boundary area. Harvest practices may reduce primary prey populations, remove forest structure used for foraging, and eliminate nesting cavities for boreal owl (Hayward 1993). Some slash piles created during harvesting activities would be retained for small mammal habitat. The Tennessee Creek project thinning objectives are based on un-even age management which would provide for owl foraging habitat and permit timber harvest. "The association of American martens with structurally complex forests is related to their needs for avoiding their own predators, accessing prey beneath the snow, and finding protected microenvironments for resting in winter and giving birth and sheltering neonates" (Buskirk 2002). Therefore, one could assume that any harvest treatments that remove structurally complex stands from the landscape would negatively impact the marten. As stated above, martens are highly associated with moist site tree species like spruce/fir and would not likely be substantially impacted by harvest treatments in lodgepole pine forests. Salvage harvests in spruce/fir, should they be implemented, would create large openings that American marten would likely not cross and would remove any structural diversity associated with that stand. Olive-sided flycatchers are most often associated with forest edges and openings caused by natural or anthropogenic disturbances, including small forest gaps resulting from tree death in old-growth forests, or along the edges of early successional forests. This project could create additional quality habitat for the olive-sided flycatcher. Abundant habitat is available in close proximity of this project (much of the project is adjacent to vast wilderness areas consisting largely of spruce/fir habitats) and all of these species are highly mobile, with the exception of the pygmy shrew, which may not as readily disperse. As mentioned above, the pygmy shrew is highly associated with "wet forests" and if present, is likely found in areas that would be avoided due to design criteria 15 above that restricts any treatment from taking place within 100 ft. of the water influence zone (WIZ). Salvage harvest would reduce snags for perching/foraging opportunities within the project area for boreal owl and olive-sided flycatcher. There would be some short-term impacts from noise disturbances during operations that would cause disruption in their activities and displacement may occur within and adjacent to treatment areas for all species addressed here. Salvage operations would cause loss of habitat for boreal owl, olive-side flycatcher and American marten and would cause negative effects as all of these species would potentially use beetle killed stands for some portion of their habitat requirements.

Habitat inside the Ski Cooper boundary has already been degraded to varying degrees due to anthropogenic disturbances, snow compaction, and habitat fragmentation (cleared ski runs). The small amount of treatment inside the ski area boundary is not likely to have substantial impacts to the species addressed here beyond what is already occurring currently. Salvage harvest operations, should they take place, would cause habitat fragmentation, loss of habitat and disturbance from project implementation. There would be no broadcast burning in spruce/fir habitat though pile burning could take place should the need arise. There are design criteria (see section 5.0 above) in place to preserve high quality habitats, snags, nest trees, denning sites etc. that would attempt to minimize the impacts to these species. The other projects proposed besides

the vegetation treatment and prescribed burning would likely have immeasurable effects on these species as those projects (Halfmoon Creek restoration, East Tennessee Creek restoration, nesting platform, campsite rehabilitation) are concentrated in a very small area for each project and would not have additional impacts beyond those that have already been discussed for vegetation management and prescribed burning. Because of the rationale provided here in conjunction with the discussion in the Cumulative Effects Section 9.1 and Environmental Baseline 8.0, Alternative 1 (Proposed Action) of the Tennessee Creek Project “**may adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing**” of the American marten, boreal owl, olive-sided flycatcher or pygmy shrew.

### **Alternative 2 Effects**

This alternative would have similar effects on the species addressed in this section because the proposal within the primary habitat (spruce/fir) of these species remains the same as that in Alternative 1 above. There would be larger negative effects should these species be utilizing lodgepole pine forests as there would be more clear cut areas (approximately 1,500 acres more in Alternative 2) but fewer acres treated overall. The impacts associated with the other actions in this alternative, (Halfmoon Creek restoration, nesting platform, campsite rehabilitation) are concentrated in a very small area for each project and would not have measurable additional impacts beyond those that have already been discussed for vegetation management and prescribed burning. Because of the rationale provided here in conjunction with the discussion in the Cumulative Effects Section 9.1 and Environmental Baseline 8.0, Alternative 2 of the Tennessee Creek Project “**may adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing**” of the American marten, boreal owl, olive-sided flycatcher or pygmy shrew.

### **9.3 Management Indicator Species (MIS)**

The Code of Federal Regulations {36 CFR 219.19 (a) (6)} states, “population trends of management indicator species will be monitored and relationships to habitat changes determined.” The purpose of this section is to evaluate MIS that may be affected by the proposed project in light of known population trends and the objective to maintain viable populations. Amendment 30 to The Land and Resource Management Plan for the PSICC (US Forest Service 2005) identified four MIS for the Pike and San Isabel National Forests, Abert’s squirrel, brook trout, elk and greenback cutthroat trout. The White River National Forest has listed the following as MIS: elk, cave bats, American pipit, Brewer’s sparrow, Virginia’s warbler, aquatic macroinvertebrates, and all trout species. All species analyzed are identified in Table 6 below. Species analyzed here will be restricted to effects on each forest. For example, cave bats are a MIS for the White River NF only and will only be analyzed if the habitat changes on the WRNF portion of the project affect them. All fish species and aquatic microinvertebrates have been analyzed in a separate fisheries report and will not be included in this section.

**Table 6.** Terrestrial Management Indicator Species for the San Isabel NF (SINF) and the White River NF (WRNF).

Species	MIS for this forest	Species expected in respective project area?	Habitat affected by project?	Further evaluation as MIS?	Primary Habitat type
Abert's Squirrel	SINF	No	No	No	mature ponderosa pine
American pipit	WRNF	Yes	No	No	alpine grassland
Brewer's sparrow*	WRNF	No	No	No	sagebrush
Cave Bats	WRNF	No	No	No	caves
Elk	Both	Yes	Yes	Yes	widespread
Virginia's Warbler	WRNF	No	No	No	Pinyon-juniper shrublands

\*Brewer's sparrow is a MIS for the WRNF and there is no sagebrush in that portion of the project area. Brewer's sparrow and sagebrush habitat is present on the SINF portion of the project and has been appropriately analyzed in the sensitive species section (9.2) above.

### 9.3.1 Rocky Mountain Elk (*Cervus canadensis*)

Pertinent elk life history and other background information are contained in the documents to which this document is tiered and in the annual SINF MIS report. Elk are found in the project area year round and tend to inhabit coniferous forests associated with rugged, broken terrain or foothill ranges. During summer, elk spend most of their time in high mountain meadows in the alpine or subalpine zones or in stream bottoms. Elk may use more open areas during spring and summer because of earlier spring green-up (Edge 1987). During hot summer months, elk seek shaded, cool habitats. Use of forage areas depends on proximity to cover. Use is typically concentrated to within 200 to 600 ft. of cover edge, but is not exclusive to these areas. Either cover or forage may be limiting to elk, particularly on winter ranges or calving habitats (Rodrick 1991). One study (Cook 1998) illustrated that "it remains uncertain that thermal cover significantly influences the nutritional condition, survival, or productivity of wild ungulates". Cook et al. (ibid) found no significant, positive effect of thermal cover on elk condition, and in fact found that "dense cover provided a costly energetic environment, resulting in significantly greater overwinter mass loss, fat catabolism and (in 1 winter) mortality". Open road densities greater than 1.5 miles per square mile of habitat on summer range or one mile per square mile of habitat on winter range are also considered a limiting factor (Rodrick 1991).

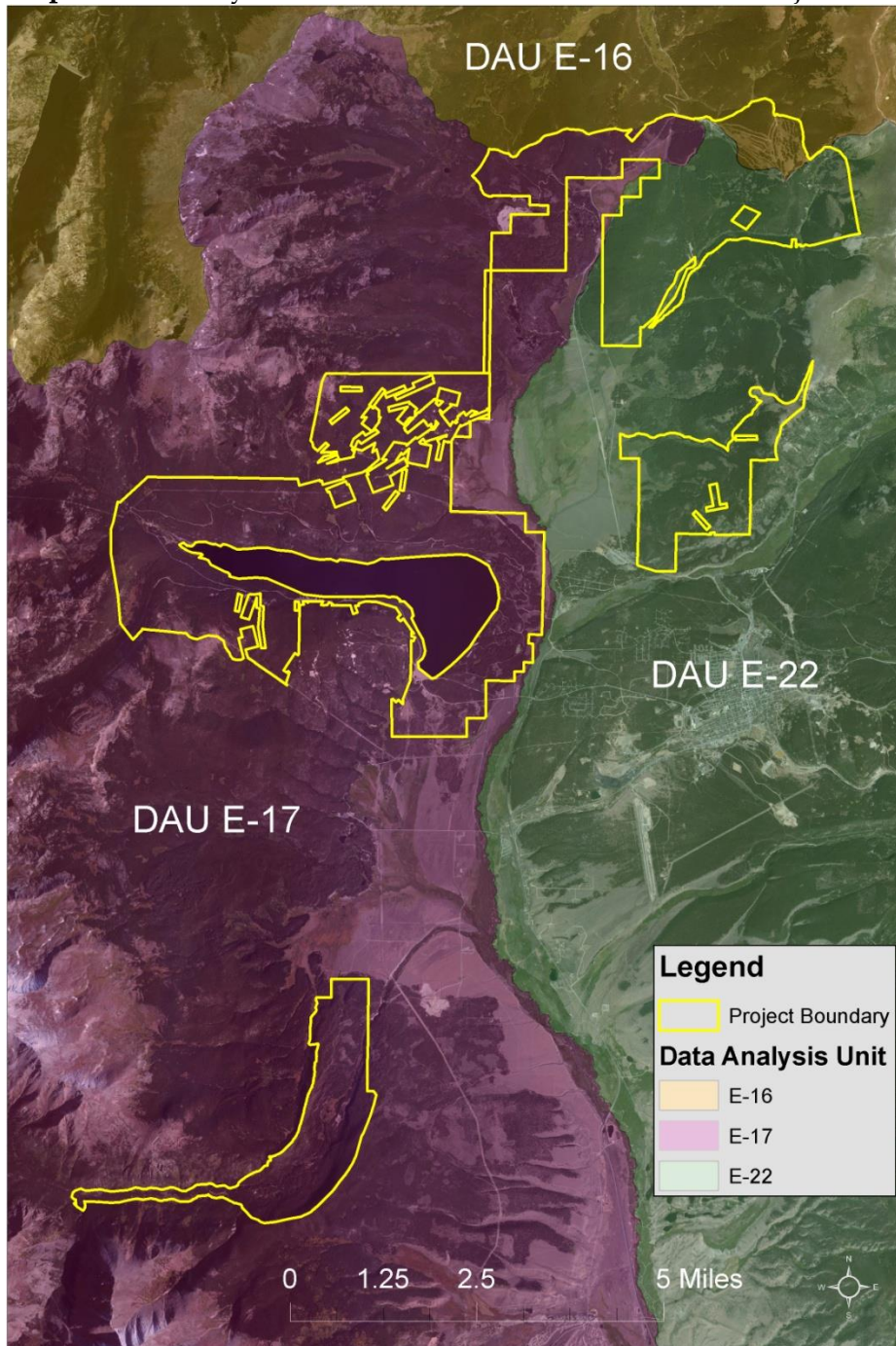
**Population Trend:** Elk populations in the project area are within population objectives and this is generally true at the statewide scale as well (Grigg, personal communication 2013). Elk are widespread throughout the northern United States and southern Canada. They are intensively managed by the state of Colorado and there is good data on population size and trends. Elk populations have generally increased in Colorado since 1975.

The Tennessee Creek project area lies within Colorado Parks and Wildlife (CPW) defined elk Data Analysis Units (DAU) E16, E17 and E22 (see Map 4 below). Data Analysis Units generally represent geographically discrete big game populations and

the DAU planning process helps establish herd objectives (Grigg 2011). The White River NF portion of Ski Cooper (520 acres) in the project area is part of Data Analysis Unit E16 which had a 2011 post hunt population estimate of 7,100 elk; well over the population object of 5,100 elk for this DAU (Mao 2012). The basis for the selection of elk as a management indicator species on the WRNF was to address the question: “does Forest motorized and non-motorized travel and recreation management result in effective use of habitat by large ungulates?” The portion of DAU E16 inside the Tennessee Creek project area is already heavily degraded in relation to this question as the majority of this section is a ski area. In fact, the only portion of the WRNF and DAU E16 included in the project boundary is the ski area and can be seen in the map below. The majority of the Tennessee Creek Project is within DAUs E17 and E22 with the west side of the project area in DAU E17 and the eastern portion including the rest of Ski Cooper and Mt Zion within DAU E22. In DAU E17, elk population objectives designated by the CPW have recently been increased to more closely match the current population to 3,150-3,850 (Grigg, Collegiate Range Elk Management Plan; Data Analysis Unit E-17 2011). Similarly, the elk population objectives for DAU E22 have also been increased to 3,150-3,500 elk to reflect current populations (Vayhinger 2005). Post hunt estimates for 2012 for DAU E17 and E22 are 3,345 and 3,236 respectively (Grigg 2013). This reflects that herds are stable and within desired population objectives. Given the wide distribution, abundance, stable or increasing population trend on the Forest and state in general, and game status of elk, there are no viability concerns at this time as all Data Analysis Units identified by the CPW are within target population goals.



**Map 4.** Data Analysis Units for Elk in the Tennessee Creek Project Area



**Habitat Trend:**

The structure, composition, and landscape pattern of vegetation in many areas used by elk on the Pike and San Isabel National Forest (PSI), particularly the lower montane zone, has been substantially altered from its pre-European conditions by cumulative human impacts. Before logging, grazing, and fire suppression, ponderosa pine stands along the Colorado Front Range were likely less dense, more open, and less vulnerable to diseases, insects, and large intense wildfires. Forested areas shifted dramatically because of the effects of logging, grazing, fire suppression, and transplanting, all of which are likely to increase tree density over the long-term. This is particularly true for



the analysis area. Extensive logging a century ago in the Leadville area virtually eliminated old-growth. Grazing also reduced understory competition and establishment of new seedlings, but the lack of fire allowed seedlings to survive. The result was a sharp increase in tree density, expansion of the area having a substantial lodgepole pine component, and the loss of openings that temporarily increased during intense logging during the late 1800's.

As Map 5 indicates below, only a small portion of the Tennessee Creek project area contains mapped winter range (1,872 acres). The Tennessee Creek project area represents <0.05% and <0.005% of the elk winter range on the Leadville District and San Isabel NF respectively (Table 7 below). There are 2,523 acres of mapped production range within the project as well; some of which overlaps with the winter range portion.

**Table 7.** Potential Elk Winter Range at the Project Area, District, and Forest Scales.

MIS Species	Acres of Potential Winter Range on National Forest Lands <sup>1</sup>			
	Project Area <sup>1</sup>	Leadville RD <sup>2</sup>	San Isabel NF <sup>2</sup>	PSICC <sup>2</sup>
Elk	1,872	58,000	490,000	820,000

<sup>1</sup> Elk winter range obtained from CPW GIS coverages and clipped to the FS ownership.

<sup>2</sup> Rounded to nearest 10,000 acres

#### **No Action Alternative Effects**

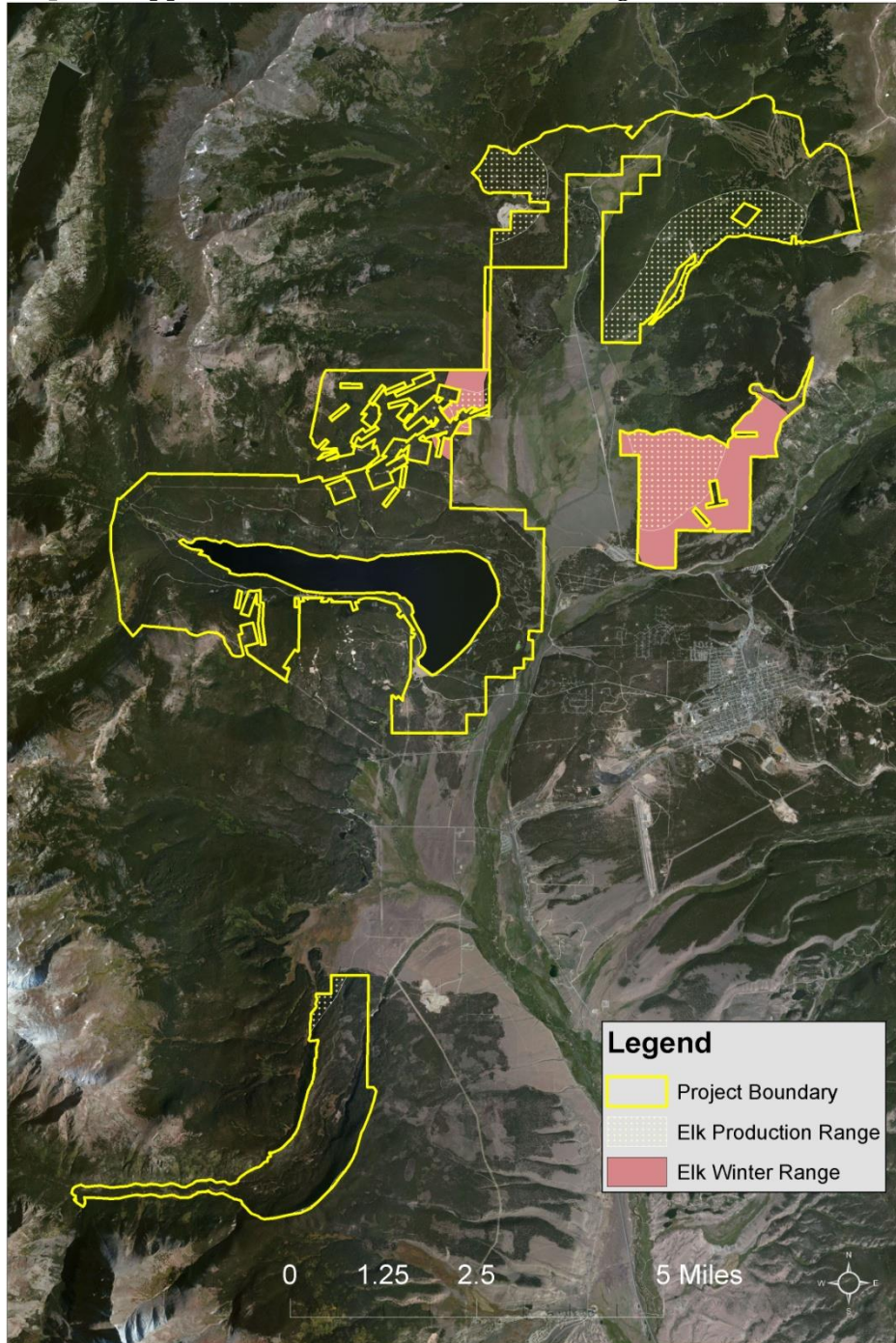
There would be no direct effects to elk for the No Action Alternative as there would be no human disturbance or direct vegetation manipulation. Forests would continue to grow and create more closed canopy stands and remain susceptible to large scale disturbances due to the monoculture of lodgepole pine that currently dominates the landscape. Natural succession would create new pockets of openings during endemic beetle events providing opportunities for new grasses and forbs to replace the trees during the short-term (0-15 yrs.). Should a large scale beetle breakout occur, large areas of trees could die leaving an overabundance of new forage for elk, at the expense of losing hiding cover. However, these large scale events are impossible to predict as to when or if they would ever occur. Because elk are capable of utilizing a variety of habitats, it is likely that the populations will continue to thrive even in the face of current levels of recreation, ongoing timber harvest, and other disturbances mentioned in the cumulative effects section. Because of these reasons, the No Action Alternative would have **“no impact”** on elk population trend or viability on the forest.

#### **Alternative 1 (Proposed Action) Effects**

This project area has designated winter range and production area range for elk (Map 5). These designations indicate that foraging and cover are important factors within these areas throughout the winter months and during calf-rearing. The quality of hiding and thermal cover within the project area is somewhat diminished in areas because lodgepole pine tends to “prune” itself as it grows, leaving fewer needles and branches to provide that cover. Currently many areas inside the project do not provide quality cover as there is little regeneration or growth in the understory that provides high quality horizontal hiding cover. Stands that do provide high quality cover will be retained as described in the proposed action above which coincides with habitat protection for Canada lynx. Thinning, clear-cutting and prescribed fire would stimulate

regeneration and would provide better quality thermal and hiding cover in the mid to long-term (15+ years) than currently exists in some areas of the project. In the short term (0-15 years), grasses and forbs would increase as the canopy would be opened up allowing more light to penetrate the forest floor, providing higher quality foraging for elk. Before this vegetation redevelops, females and their calves could move into other available habitat adjacent to the project area for calving and all elk could disperse to adjacent areas available during the winter.

**Map 5.** Mapped Elk Winter and Production Range in the Tennessee Creek Project Area.



Migration of large ungulates in this region is triggered by snow depths which deem forage inaccessible. During the winter, clear cuts, heavily thinned areas and temporary roads (depending on roadside cover) would accumulate deeper levels of snow compared to the treed stands in the same area. This could cause additional energetic costs during winter for big game to traverse through these areas or cause a change in movement patterns as animals avoided the clear cut by traversing around during seasonal migration. Conversely, these same clear cut areas would also melt faster than treed areas providing earlier foraging and easier travel through these areas in spring when fat reserves and body conditions are usually suboptimal. Openings are designed to augment current natural openings (meadows already on the landscape) and mimic natural disturbance regimes and would not be larger than 40 acres. Clear cuts would likely be located in or near elk migration corridors (lower elevation lodgepole pine) as mapped (Colorado Parks and Wildlife 2013) in order to address the purpose and need of this project.

During implementation, elk would likely avoid using the project area as disturbance would be increased due to noise, people, and machinery. Again, implementation would be spread out over the course of 10 years throughout the project area. Prescribed fire would bring an additional temporary increase in disturbance due to smoke for several days afterward, deterring elk from using the immediate area. There is habitat available adjacent to the project area in which elk could seek refuge during the time this project is implemented. Disturbance to the ground may provide the opportunity for noxious weeds to invade the native vegetation, thus discouraging foraging by elk within the project area. However, the proposed action addresses noxious weeds and would incorporate treating pre and post treatment to discourage non-native vegetation from spreading. Other actions associated with this proposal (Halfmoon Creek restoration, nesting platforms, etc.) would have negligible impacts as the footprint of those actions are minute in relation to an elk's home range and these animals would be able to easily disperse to adjacent habitat during project implementation.

Design criteria 11, 12, 13, and 14 are in place to protect elk during the most critical times throughout the year and are again listed here:

11. In forested areas, maintain a 200 foot deer and elk hiding cover buffer along 75% or more of each side of arterial and collector roads (Forest Plan, pg. III – 153). Arterial and collector roads in the project area include FSR 100 Wurts Ditch Road, FSR 105 Hagerman Pass, and FSR 110 Halfmoon Road. Treatments would be allowed in the cover buffer as long as hiding cover is maintained.
12. To protect big game (mule deer, elk, moose, and bighorn sheep) critical winter range, winter range, and winter concentration areas, seasonal restrictions for timber harvest and associated activities will be implemented on winter range within the project area from December 1 to April 15. Prescribed burning activities may be acceptable during this time period and will be coordinated with the Wildlife Biologist.

13. If conflicts with other species protection measures prohibit effectively operating during the summer months in an area (restrictions for raptor nest sites, etc.), timber harvest operations may take place on winter range (moose, elk and deer) during the restriction period IF *both* of the following criteria are met:
- a. A locked gate will be placed at the entrance to temporary roads used to access a treatment area to prohibit all motor vehicle access (except for authorized administrative use – FS personnel and timber contractors).
  - b. Only 20% of the mapped winter range will be operated on during the restriction dates to allow big game to utilize the other 80% during this time. This would allow up to approximately 375 acres of treatment per year in elk/deer winter range during the restriction periods and up to 180 acres in moose winter range, if necessary.
14. Avoid disturbing elk calving and mule deer fawning concentration areas from May 15 to June 30.

Thinning, prescribed burning, and regeneration treatments will likely increase forage production and would be beneficial to elk. Action Alternative 1 would likely increase quality foraging opportunities as well as decrease important hiding cover for elk in the short term (0-15 yrs.) However, the long-term effects would shift and hiding and thermal cover would increase as regenerating trees develop and take over the grass and forbs that initially provided new foraging areas. Again, the implementation of this project would take 10 years and the treatments are spread out over a very large area, never impacting one isolated area to a degree in which elk would not utilize some portion of the treated area. Overall, implementation of Alternative 1 (proposed action) is expected to have **“no effect on elk population trend or viability on the PSICC.”**

#### **Action Alternative 2**

Again, this alternative is very similar to the above proposed action in treatment proposals except that it is smaller in overall size (approximately 2,595 acres less) with a switch in percentages of lodgepole clear cuts and thinned areas. There would be much more area converted temporarily to openings, about 1,500 acres more than the proposed action and fewer acres (4,080 acres less) thinned. The amount of aspen treated would also increase slightly with an additional 65 acres of aspen being treated. All other activities proposed (stream restorations, campsite restorations, etc.) would remain the same and would have identical effects as in Alternative One. The type of disturbances (machinery, noise, human disturbance, vegetation removal) would have the same effects (dispersal, avoidance, decreased cover and increased foraging) but to different degrees. There would be a larger initial increase in foraging as there would be more openings created and less loss of hiding and thermal cover due to fewer acres being treated overall. Again the mid to long-term (20+ yrs.) effects would then reverse as the

regenerating trees would provide quality hiding and thermal cover as they repopulated the clear cuts that once provided the foraging opportunities. Though the effects may be greater for this action alternative due to the higher degree of clear cutting, implementation of Alternative 2 is still expected to have **“no effect on elk population trend or viability on the PSICC.”**

### **Cumulative Effects**

Many activities that have occurred in the past, are ongoing or are reasonably anticipated add to the cumulative effects on elk in the project area. As mentioned in the “Habitat trend” section above, mining has occurred within these DAUs since the late 1800’s when miners harvested much of the conifers for mining timbers, fuelwood, and charcoal. These activities essentially left massive clear cuts across the land and mostly lodgepole pine and aspen were the only trees that regenerated. Fire suppression also added to the creation of homogenous dense stands as sapling survival increased without natural fires. Tree species diversity, structure and stand size were reduced, thereby degrading wildlife habitat.

There have been numerous small scale timber projects within these DAUs ranging from clear-cut harvests to thinning. Public and commercial sales are ongoing and are projected to continue on a limited basis. These timber projects can impact elk both positively and negatively. Removing habitat directly reduces thermal and hiding cover but also opens up the canopy, encouraging more favorable foraging growth.

Recreation has and continues to be popular within each DAU. This includes off-highway vehicle (OHV) use, hiking, biking, horseback riding, camping, snowshoeing, skiing, snowmobiling and various races. This amount of varied use often leads to the creation of non-system roads and trails that further impact wildlife by direct removal of habitat, fragmentation of habitat and disturbance from people and noise associated with each activity. User created roads also increase soil erosion and the spread of noxious weeds which also degrades elk habitat by decreasing native vegetation.

Urban development along private lands also impacts elk by degrading habitat, fragmenting habitat and increasing human disturbance.

All these activities have altered the present landscape to various degrees and have direct, indirect and cumulative effects on elk. The proposed project could add to these effects on elk through disturbance due to project implementation, though user numbers would be expected to return to pre-treatment levels after the project is completed.

Hiding cover would be reduced by the removal of trees along the roadways, though self “pruned” lodgepole have decreased the quality of hiding cover in some areas. Other areas do provide adequate or quality cover and would be reduced in the short term (0-15 yrs.) after implementation. The project area is within CPW mapped winter and production (calving) range (Colorado Parks and Wildlife 2013). These are areas where elk typically concentrate during the winter months and during their calf-rearing period. As mentioned above, project design criteria restrict operational periods during production and stressful winter seasons.

### **Land and Resource Management Plan MIS Objectives**

The Tennessee Creek Project occurs in Management Areas 4B and 5B. General direction for management area 4B is to manage for the habitat needs of Management Indicator Species (MIS) and species commonly hunted, fished or trapped and to maintain hiding cover for elk and deer, where present. Management area 5B has similar guidelines in maintaining habitat capability for MIS and providing big-game forage, cover and

habitat. Elk are both a MIS and big game animals. Mule deer and moose are not MIS, but are found in the project area and are considered under this proposal for providing for big game habitat. Bighorn sheep are also considered big game in Colorado but were analyzed above in the sensitive species section and have winter range protections in place through design criteria 12. Mule deer winter range happens to coincide with elk winter range in this project but at a smaller scale (it is mapped only in the southern most portion of the elk winter range on Mt. Zion). Moose winter range is mapped in the northern portion of the project area (approximately 904 acres) (Colorado Parks and Wildlife 2013). It should be noted that habitat maps occasionally are updated and changed and the most current map available at the time of implementation will be used for big game species. All design criteria implemented for elk winter and production range will also coincide with and protect mule deer winter range. There are no deer fawning areas mapped within the project area. This project would impact less than 0.05% of elk winter range on the District and less than 0.005% of elk winter range at the Forest levels and even less would be impacted for mule deer. Hiding cover along arterial roads (as mentioned above) will be maintained according to the Forest Plan (along 75% of a forested road, enough hiding cover will remain to hide 90% of a standing deer or elk from a distance of 200 ft.). Hiding cover along other roads (including the most commonly used roads during hunting season in the project area) will not necessarily be maintained and could be lost in the short-term (0-15 yrs.) in some areas. In the long term, these areas adjacent to the roads may provide higher quality hiding cover as newer regeneration tends to have higher horizontal cover than the current, older lodgepole stands. Long-term (20+ years) effects of harvesting and burning may increase hiding cover from what is currently available in the project area. There would also be a short-term (<15 year) increase in forage availability within treatment areas which is currently lacking in some areas of the project which would benefit elk and deer in the short and mid-term. Moose forage on willows and riparian plant species. Riparian areas will be buffered from treatment and this project would cause no change in the availability of forage for moose.

### **MIS Summary**

Given the wide distribution, abundance, population stability on the forest and state, and game status of elk, there are no viability concerns at this time as all Elk Data Analysis Units identified by the CPW exceed or are within target population goals. Elk would be expected to maintain current levels and trends though slight changes in distribution may occur on a limited scale. Grasses, forbs, and shrub regrowth would occur and foraging opportunities would increase over time in both quality and quantity until over story development takes place in the long-term (20+ years) when quality and quantity of forage likely will decrease within the Project Area. Less than 0.005% of winter range habitat on the San Isabel National Forest (490,000 acres) would be effected by the proposed action treatment area, so regardless of potential impacts to elk, there is a very low potential to affect trend or viability on the unit.

## **9.4 Migratory Birds**

The Migratory Bird Treaty Act (MBTA) was established in 1918 and signed into law under a treaty (convention) with Great Britain to protect migratory birds. Subsequently additional treaties were also made with Mexico (1936), Japan (1972), and the Soviet Union (1976). Today, over 1,000 bird species are protected under the MBTA. This act



prohibits anyone to “*pursue, hunt, take, attempt to take, capture, kill, possess, offer for sale, sell, offer to purchase, deliver for shipment... or export...any migratory bird, included in the terms of this Convention...or any part, nest, or egg of any such bird...*”. Executive Order (EO) 13186 of January 19, 2001 directs the federal government to take a lead role in protecting migratory birds, incorporate bird conservation into agency programs, activities and planning, evaluate the effects of agency actions on migratory birds, minimize take of species of concern, and address habitat conservation.

The US Fish and Wildlife Service has identified 27 species of concern for the Bird Conservation Region (Southern Rockies) in which the Tennessee Creek Project lies (U. S. Fish and Wildlife Service 2008). Many of these species have already been analyzed or excluded from analysis under the sensitive species section of this EA while several others would not be expected in the project area. See Appendix 1 for a complete list of migratory bird species of concern. This project could impact migratory birds directly, indirectly, and cumulatively through habitat loss, fragmentation, and loss of habitat effectiveness. Some short-term effects to migratory birds include: disturbance from machine noise, people, vehicle traffic, smoke from prescribed burns, and changes in nesting and foraging habitat. However these bird species are highly mobile and would be able to disperse easily to adjacent suitable habitat should they be in the area during implementation. Depending on species, treatments could be beneficial to nesting and foraging habitat as well (i.e. species that prefer more open understories for foraging could benefit. The Tennessee Creek project includes nine different design criteria that apply to TES and/or migratory bird species. Because of these design criteria, implementation of this project may have some short-term adverse impacts to individuals, but no long-term impacts to migratory bird populations.

## **10.0 SUMMARY FOR ALL SENSITIVE AND MANAGEMENT INDICATOR SPECIES**

The following is a summary of the rational presented above used to support the below effect determination for Forest Service sensitive and Management Indicator Species addressed.

- The status is unknown in the analysis area for many of these species; however, suitable habitat is present and therefore presence is assumed as per FSM 2670 and 2672.
- Protection measures are in place (design criteria) for known or newly discovered sensitive or MIS species nests, denning sites, winter range etc. in or near the project area.
- Once harvest operations are completed use by some of the species addressed is expected to be the same as what occurs currently in the area.
- Some habitat within the project area has already been degraded in quality and quantity from current and ongoing activities.
- Vegetative species that are not dominant in the project area (spruce/fir, riparian, etc.) will be retained and encouraged to thrive with this proposal creating more diversity throughout the landscape.
- Wildfires are expected to increase in both number and intensity with large stand replacing fires becoming more likely than in the past due to increased fuel accumulations and the increased prevalence of stand structural homogeneity in

forests on a landscape scale with fewer natural openings or firebreaks present. Small prescribed fires are beneficial to all species analyzed as a whole in that they increase the diversity of the area and optimal habitat for each species is renewed. Individual animals may be negatively impacted if their home range is burned, but surrounding habitats will provide for local population sustainability.

## 11.0 EFFECTS DETERMINATIONS SUMMARY

**Table 8.** Effect determinations for each species addressed in the Tennessee Creek Project BE/MIS report for each alternative considered.

SPECIES NAME	SCIENTIFIC NAME	STATUS CODE <sup>1</sup>	DETERMINATIONS OF EFFECT <sup>2</sup>		
			<i>NO ACTION ALTERNATIVE</i>	<i>ALTERNATIVE 1 (PROPOSED ACTION)</i>	<i>ALTERNATIVE 2</i>
AMPHIBIANS					
Boreal toad	<i>Anaxyrus boreas boreas</i>	S	MAII	MAII	MAII
Northern leopard frog	<i>Lithobates blairi</i>	S	MAII	MAII	MAII
Bald eagle	<i>Haliaeetus leucocoephalus</i>	S	MAII	MAII	MAII
Boreal Owl	<i>Aegolius funereus</i>	S	NI	MAII	MAII
Brewer’s Sparrow	<i>Spizella breweri</i>	S, MIS	NI	MAII	MAII
Flammulated Owl	<i>Otus flammeolus</i>	S	NI	MAII	MAII
Northern Goshawk	<i>Accipiter gentilis</i>	S	MAII	MAII	MAII
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S	NI	MAII	MAII
American marten	<i>Martes americana</i>	S	NI	MAII	MAII
Rocky Mountain Bighorn Sheep	<i>Ovis canadensis canadensis</i>	S	MAII	MAII	MAII
Elk	<i>Cervus Canadensis nelsoni</i>	MIS	NI	MAII	MAII
Hoary bat	<i>Lasiurus cinereus</i>	S	MAII	MAII	MAII
Pygmy shrew	<i>Sorex hoyi</i>	S	NI	MAII	MAII
River otter	<i>Lontra Canadensis</i>	S	MAII	MAII	MAII

<sup>1</sup> STATUS CODES: MIS = Management indicator species, S=FS sensitive

<sup>2</sup> NI=no impact; MAII=may adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend toward federal listing; and LRLV=likely to result in a loss of viability on the Planning Area, or in a trend toward federal listing.

## 12.0 MITIGATION MEASURES

No mitigation measures are necessary for this project due to project design criteria that would be implemented to reduce and/or eliminate unacceptable negative effects to species analyzed for in this document.



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Appendix 1. Migratory bird species of concern listed for the Bird Conservation Region - Southern Rockies.

**Exclusion Rational Codes:** **ODR**= outside distributional range of the species; **HAB**=no habitat present in Analysis area; **ELE**=outside elevational range of species

Bird Species	Potential to be in Project Area	Rationale for Exclusion	Habitat Description
<b>Gunnison sage grouse</b> <i>Centrocercus minimus</i>		ODR, HAB	tall dense stands of sagebrush near wet meadows with tall grasses for hiding; occurring primarily in SW & W CO, but also including Saguache & S Chaffee County.
<b>American bittern</b> <i>Botaurus lentiginosus</i>		ODR, HAB	large cattail marshes or wetlands with tall emergent vegetation; summer resident on eastern plains of Colorado and in mountain parks
<b>Bald eagle</b> <i>Haliaeetus leucocephalus</i>	X analyzed in sensitive species section		near open water including rivers, streams & lakes, nesting & roosting in large ponderosa pine, Douglas-fir, or cottonwood trees in proximity to open water and rivers.
<b>Ferruginous hawk</b> <i>Buteo regalis</i>		HAB	Flat rolling prairies semi-desert shrub-steppe, low elevation, 3000' to 9500' elevation
<b>Golden eagle</b> <i>Aquila chrysaetos</i>	X Potential impacts reduced by design criteria 11,12,14, and 15		favor partially or completely open country, especially around mountains, hills, and cliffs. They use a variety of habitats ranging from arctic to desert, including tundra, shrublands, grasslands, coniferous forests, farmland, and areas along rivers and streams.
<b>Peregrine falcon</b> <i>Falco peregrinus anatum</i>		HAB	wide variety of habitats, selects cliff ledges or rock outcroppings for nesting, preferring high, open cliff faces that dominate the surrounding area.
<b>Prairie falcon</b> <i>Falco mexicanus</i>		HAB	inhabit grasslands, shrub-steppe, deserts, cliff bands and other open areas of the West up to about 10,000 feet elevation
<b>Snowy plover</b> <i>Charadrius nivosus</i>		HAB, ODR	Barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation ponds, river bars, along alkaline or saline lakes, reservoirs, and ponds.
<b>Mountain plover</b>		ODR, HAB	Short grasslands occurring primarily on flat areas with

<i>Charadrius montanus</i>			short grass and scattered cactus; occurring mainly on eastern plains of CO
<b>Long-billed curlew</b> <i>Numenius americanus</i>		HAB	Primarily found in plains grasslands and sometimes in wheat fields or fallow fields and nests close to standing water
<b>Yellow-billed cuckoo</b> <i>Coccyzus americanus</i>		ODR	Eastern subspecies: riparian forests along the Arkansas River & urban areas with tall trees; a rare to uncommon spring & fall migrant & summer resident of E CO & SW KS
<b>Flammulated owl</b> <i>Otus flammeolus</i>	X analyzed in sensitive species section		old-growth or mature ponderosa pine, ponderosa pine, & Douglas-fir forests, often mixed with mature aspen, nesting in cavities, feeding on insects.
<b>Burrowing owl</b> <i>Athene cunicularia</i>		HAB	Nests primarily in rodent burrows in grasslands, shrublands, deserts and grassy urban areas; most observations in eastern third of CO
<b>Lewis's woodpecker</b> <i>Melanerpes lewis</i>		ELE, HAB	lowland & foothill riparian forests, agricultural areas, urban areas with tall deciduous trees, & foothills including Wet Mountains & grasslands; elevation preference 3,500-7,000 ft.
<b>Willow flycatcher</b> <i>Empidonax traillii</i>	X Potential impacts reduced by design criteria 24		Breeds in moist, shrubby areas, often with standing or running water, especially riparian willow thickets
<b>Gray vireo</b> <i>Vireo vicinior</i>		HAB, ODR	Found in desert scrub, mixed juniper or pinyon pine and oak scrub associations, and chaparral, in hot, arid mountains and high plains scrubland
<b>Pinyon jay</b> <i>Gymnorhinus cyanocephalus</i>		ELE, HAB	low-elevation conifer woodlands (primarily pinyon-juniper); restricted to elevation (4,500-7,500 ft.)
<b>Juniper titmouse</b> <i>Baeolophus ridgwayi</i>		HAB	Warm, dry open woodland, especially juniper woodlands
<b>Veery</b> <i>Catharus fuscescens</i>	X Potential impacts reduced through design criteria 14, 15, and 24		Breeds in damp, deciduous forests and riparian habitats. Prefers disturbed forest with denser understory. Also in shrubby habitats with small trees
<b>Bendire's thrasher</b> <i>Toxostoma bendirei</i>		ODR, HAB	Desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca, and in juniper woodland
<b>Grace's warbler</b> <i>Setophaga graciae</i>	X Potential impacts		Tall, mature pine

	reduced through design criteria 14 and 15		
<b>Brewer's sparrow</b> <i>Spizella breweri</i>	X analyzed in sensitive species section		Sagebrush, mountain meadows, and mountain shrub habitat in CO.
<b>Grasshopper sparrow</b> <i>Ammodramus savannarum</i>		ODR, HAB	almost exclusively prefer the prairie grasses or grasslands with rabbitbrush or saltbrush, all breeding evidence far east of the Forest
<b>Chestnut-collared longspur</b> <i>Calcarius ornatus</i>		ODR, HAB	Tall shortgrass prairie and introduced grasses; fairly common on the E and NE plains of CO, but is rare west to the base of foothills and accidental in mountains
<b>Black rosy-finch</b> <i>Leucosticte atrata</i>		HAB	Breeds in alpine areas, usually near rock piles, and cliffs. Winters in open country, including mountain meadows, high deserts, valleys, and plains
<b>Brown-capped rosy-finch</b> <i>Leucosticte australis</i>		HAB	Above timberline wherever proper cliffs, caves, rock slides, or old buildings provide nest sites, and where adequate feeding grounds on tundra, rock slides, snowfields, and glaciers are within commuting distance
<b>Cassin's finch</b> <i>Haemorhous cassinii</i>	X Potential impacts reduced by design criteria 14 and 15		live in evergreen forests in the mountains up to about 10,000 feet elevation. In winter, they may move to lower elevations. They feed heavily upon seeds of pines and quaking aspen

\*Habitat information and rationale for this table is tiered to Threatened, Endangered, and Forest Service Sensitive Species on the Pike and San Isabel National Forests (Wrigley 2012) as well as the online database provided by the Cornell Lab of Ornithology (Cornell Lab of Ornithology 2013).